Project ABC: Advancement Based on Competency Summative Evaluation

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Alberta Education

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PLEASE NOTE

The views and recommendations expressed in this report are those of the researcher and not necessarily those of the Calgary Board of Education or the Department of Education.

PROJECT ABC:

ADVANCEMENT BASED ON COMPETENCY

SUMMATIVE EVALUATION

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ABSTRACT

Project ABC: Advancement Based on Competency was a five-year study funded jointly by Alberta Education and the Calgary Board of Education for the sum of $999,950 which took place from 1982-1987. It explored alternatives to the Carnegie Unit in three senior high schools. Three independent models evolved from the project, specifically the Department-based Model, the Parallel Core Program Model and the School-wide Model. Student achievement overall was found to be generally comparable to non-project student achievement within the Calgary Board of Education and the Province of Alberta. Few significant differences were identified. Provincial curriculum was adhered to in individualized instruction and continuous progress formats and in some cases was found to be superior. It was concluded that it was possible to remove the criterion of time and replace it with the criterion of demonstrated competency and that indeed competency was an appropriate basis for advancement at both unit and course levels.

A review of the literature revealed that a similar but far more extensive study had been conducted in the United States from 1932-1940 entitled the Eight-Year Study. Based on the findings of that study and this, nearly fifty years later, the conclusion was drawn that personalized instruction and continuous progress are viable educational alternatives and should no longer be considered experimental.

EXECUTIVE SUMMARY

Project ABC: Advancement Based on Competency was a five-year study conducted from 1982-1987. It was funded jointly by Alberta Education and the Calgary Board of Education for a total of $999,950. Its purpose was to explore alternatives to the Carnegie Unit in three Calgary high schools.

The Carnegie Unit was established in 1907 to regulate the distribution of college pension funds but quickly came to standardize the quality of high schools in North America. Currently in Alberta one credit requires a minimum of 25 hours of instruction; thus a five-credit course requires a minimum of 125 hours of instruction. It has long been felt, however, that more or less than the 125 hours might be more appropriate for an individual student's learning needs than the traditional requirement. In fact, a long-buried study entitled the Eight-Year Study was conducted in the United States from 1932-1940 exploring flexible time use in the high school. That study concluded that departures from prescribed patterns of both time use and curriculum did not lessen students' readiness for college and that actually the more fundamental the changes instituted by the high school, the better the students achieved in college.

Project ABC evolved from an interest held by Alberta Education in exploring alternatives to the Carnegie Unit and by a perceived need by the Calgary Board of Education to address the needs of dysfunctional students whose needs were not then being met by the high school.

Each of the three schools in the project developed its own model and these are outlined below:

Department-based Model - William Aberhart High School Business Education Program

An open-area program offering all 20- and 30-level Business Education courses simultaneously throughout the school day in an individualized instructional format using continuous progress as the method for student advancement.

Parallel Core Program Model - John G. Diefenbaker High School PEP (Personalized Education Program)

A school-within-a-school model for core courses involving approximately 100 students in each of Grades 10 through 12 who were selected for learning independence. A combination of flextime and demand time was used by students to orga-

nize their school day according to their perceived learning needs. The program was supported by a test centre and a Teacher Advisor system. Enrichment activities were stressed.

School-wide Model - Ernest Manning High School
PACE (Personalized and Continuous Education)

An individualized, continuous progress model for Grades 10 through 12 encompassing the whole school, supported by a test centre and a Teacher Advisor system.

A Steering Committee comprised of representatives from both Alberta Education and the Calgary Board of Education guided the evaluation of Project ABC and developed a series of evaluation goals, as follows:

1. Primary Goals

   To assess the success of project schools in providing students with acceptable alternatives to the time-credit relationships expressed in the current Junior and Senior High School Handbook where:

   (a) The student achievement level is as good as or better than achievement levels, in both local and provincial programs.

   (b) The Alberta Curriculum is adhered to.

   (c) Time has been removed as a requirement in awarding credit.

   (d) Competency has been made the basis for awarding credit.

2. Secondary Goals

   (a) To provide project schools with information concerning students' educational experiences in terms of the principles of personalized instruction and continuous progress.

   (b) To provide Alberta Education with information regarding adherence to the Alberta Curriculum in project schools.

   (c) To provide Alberta Education with information for use in the consideration of province-wide application of alternatives to time credit.

Further, several key concepts were defined by the committee. ***Personalized instruction*** was defined as including:

1. Placement appropriate to learning style
2. Varied learning environments
3. A "stop mechanism" for students to obtain assistance at any point in a course
4. Demonstrated competency in each unit of a course before proceeding to the next unit
5. Opportunities for enrichment

Continuous progress was defined as including:

1. A learning rate compatible with ability
2. Flexible timetabling to accommodate personal choice or need
3. Advancement based on competency demonstrated rather than time spent in a course

Later in the project, school personnel defined the concept of *competency* as follows:

> Students must demonstrate a competency level of at least 50% in a unit or course before proceeding to the next unit or course. However, in certain cases, higher competency levels for particular units may be required (e.g., Safety Unit in Chemistry).

Based on these goals, a series of research questions was developed and an evaluation study was designed. There were two distinct parts to the evaluation: the formative evaluation which involved an annual cycle of evaluative activities culminating in an annual Formative Evaluation Report; and the summative evaluation which is presented in this document. The formative reports focussed on the concepts of personalized instruction and continuous progress which were of particular interest to the schools' planning process, while the summative report has addressed the evaluation goals identified by the Steering Committee which were of particular interest to Alberta Education. Both types of evaluation looked at student achievement; attitudes and perceptions of students, teachers and administrators; and contextual data. In the final year of the project, a policy Delphi study was conducted with a panel made up of project teachers and administrators. This provided additional useful background information such as perceived project benefits and problems, important teacher characteristics and key components of a Project ABC-type program.

Student Achievement

Student achievement scores for 30-level courses in project schools were compared with the scores of all Calgary Board of Education and all Alberta students registered in those courses using the computer program SPSS-X (Statistical Package for the Social Sciences) ONEWAY procedure, a univariate analysis of variance which identified significant differences between mean scores over time and between project mean scores and control group scores. This was followed by *post hoc* testing using the Scheffé procedure.

Study findings indicated that achievement levels of students within each program did not fluctuate significantly over the course of the project. Overall, achievement levels for project students were generally comparable with achievement levels of non-project students in the Calgary Board of Education and the Province of Alberta. Few significant differences occurred.

Curriculum Adherence

Curriculum developed by Project ABC teachers was reviewed annually by curriculum consultants from Alberta Education to determine if contents and standards in project courses remained comparable to those across the province. They concluded that the development of individualized materials did not have a negative effect on either content or standards and in some cases, particularly in the Parallel Core Program Model, the materials were judged to be superior.

Removal of Time as a Credit Requirement

Student perceptions were collected regarding key concepts related to the removal of time as a credit requirement and the development of competency as the basis for awarding credit through the administration of a questionnaire which measured their attitudes and perceptions. Teachers and administrators were also polled with questionnaires. A sample of each of the three groups was interviewed annually to help clarify the data collected. For the summative analysis, key concepts on the student questionnaire were analyzed using the SPSS program ONEWAY followed by ***post hoc*** testing. Descriptive statistics for these concepts were also extracted from teacher and administrator questionnaires.

All three models were determined to be functioning outside of the traditional Carnegie Unit allowing students more or less time than the 125 hours according to their learning needs. The Department-based and School-wide Models provided for continuous and individual progress from unit to unit and from course to course. The Parallel Core Program Model provided for variable learning rates within the unit but students proceeded from unit to unit together.

Competency as the Basis for Awarding Credit

Perceptions regarding competency as the basis for awarding credit rather than time spent in a course were treated in a similar manner to those reported in the section above. Key concepts were selected for the summative analysis along with interview data.

All three models were found to deal with competency issues relating to non-traditional use of time. The School-wide Model was the most successful in terms of project evaluation criteria in making competency demonstrated rather than time spent the basis for awarding credit. The Department-based Model also achieved this goal, although some non-sequential material was handled differently at the unit level. The Parallel Core Program Model used a different approach, for while competency was the basis of awarding credit, individual rates of course completion were not a school goal. Instead student selection for the program and a variety of excellent instructional techniques helped to ensure that students would succeed within allotted time limits.

Considerations for Provincial Application

Results of the policy Delphi study conducted in 1987 provided useful contextual information. A number of project benefits were identified, most particularly for students who appreciated the opportunity to learn at their own rate and to work on a one-on-one basis with their teachers. Teachers and administrators also felt that students assumed more responsibility for their learning and developed confidence and independence. Teachers gained from the project as well in terms of increased freedom to experiment, greater awareness of different teaching styles and greater satisfaction. Alberta Education consultants believed that Project ABC teachers had grown professionally from the experience. The greatest benefit to the school to emerge from the project was the promotion of an atmosphere of cooperation between staff and students. Schools also gained materially from their involvement in the project through increased funding which provided support for paraprofessionals, improved library resources, additional computers, learning materials and instructional equipment.

The most serious disadvantages or perceived problems emerging from the project were rated lower than the perceived benefits thereby highlighting the overall perceived benefit of the project. For students, the main disadvantage was the ease with which they could fall behind in their work. Teachers and administrators also felt that students sometimes lacked understanding about program demands and how to handle them. For teachers, perceived disadvantages included the added stress and potential burnout associated with being part of an alternative project, increased workload, and frustration with unclear goals, particularly in the School-wide Model. Problem areas identified for schools included increased resource needs, more complex resource management, and the need for strong leadership.

Key components required for an alternative to time-credit program were identified, the most critical of which included:

1. Specially selected teachers who demonstrate the characteristics of openness to change, industry, receptiveness, energy, flexibility, who are team players and who support the alternative philosophy.
2. Support from local board, the community and government.
3. Adequate lead time for curriculum development and time for ongoing revision.
4. Decisive leadership.
5. A sound educational rationale coupled with adequate staff development and new teacher orientation.
6. Effective student monitoring, tracking and record keeping systems.
7. Clear and consistent policies, expectations and consequences for students.
8. A school-wide philosophy and total school staff involvement in and commitment to the alternative program.
9. Adequate clerical and paraprofessional support.
10. Adequate ongoing teacher release time for planning and coordination.
11. Sufficient funding to initiate and maintain the program.
12. Adequate program size to maintain one-on-one interaction between teachers and students.

13. Timetable flexibility.
14. Good liaison with feeder schools.
15. Good communication with parents.

A final critical component which emerged from the perceptions of Alberta Education consultants and final-year interviews was the need for a flexible physical plant with a variety of instructional spaces available for large groups, seminars and individual study, as well as traditional classroom areas.

Budget Considerations

The different nature of a Project ABC-type program has some budget considerations which must be addressed before such a program can be developed.

The first area is related to resources including a broader range of materials and multiple copies of audio-visual materials in order to meet the demands of an individualized program; stepped-up security; increased maintenance; information processing facilities such as computers, word processors, and photocopiers; and increased paper supplies. The second area relates to staff costs with an increased requirement for paraprofessional and clerical support, professional development costs for staff training and new teacher orientation, and teacher release time for initial curriculum development as well as annual release time for revision and planning.

A decentralized budgeting model appears to be the most appropriate way of managing the more complex resource requirements placed on a school by a Project ABC-type program. In this way, program priorities such as staffing can be supported by school-based decision making.

Conclusions

Conclusions of the Project ABC evaluation include:

1. Achievement levels of Project ABC students were as good as student achievement levels in both local and provincial programs.

2. The Alberta Curriculum was adhered to in all three Project ABC schools. In the Parallel Core Program Model, provincial requirements were exceeded.

3. The three Project ABC schools successfully provided alternatives to the Carnegie Unit.

4. Project ABC demonstrated that competency rather than time spent in a course can become the basis for awarding credit.

5. Personalized instruction and continuous progress are viable educational alternatives and should no longer be considered experimental.

6. Program delivery can be successfully individualized, although the nature of the subject matter will have an impact on the degree to which individualization can occur.

7. Models for a Project ABC-type program should emerge from the nature of the individual school and its community.

8. This type of program is particularly appropriate for students who are independent learners.

9. This type of program is best implemented by teachers who support and practise the project philosophy.

10. This type of program requires a clear program vision, commitment of the total school staff and strong administrative leadership.

11. This type of program requires more complex financial management than a traditional program and involves both start-up and maintenance costs which are different from traditional resource allocations in order to support resource needs, professional development and orientation, teacher release time, and paraprofessional and clerical assistance.

12. A flexible physical plant design enhances the implementation of this type of program but it is not essential.

Recommendations

Recommendations for the Calgary Board of Education include that:

1. Contingent upon Alberta Education approval, the three Project ABC programs be granted exemption from the Carnegie Unit.

2. Contingent upon Alberta Education approval, opportunity be provided for other Calgary Board of Education schools to offer Project ABC-type programs which are also granted exemption from the Carnegie Unit.

3. The School-wide Model achievement levels be evaluated for an additional two years.

4. Consideration be given to exploring different ways of allocating resources to Project ABC-type schools.

5. Consideration be given to the teacher characteristics identified in this study as being critical to program success when assigning staff to Project ABC-type programs.

6. Consideration be given to student learning styles and to matching them with appropriate program delivery when enrolling students in Project ABC-type programs.

7. Flexible instructional space be considered in the construction of new schools and the renovation of existing ones.

8. Project ABC teachers and administrators be formally commended for their dedication and commitment in making these programs successful and that their successes be celebrated.

Recommendations for Alberta Education include that:

1. Contingent upon Calgary Board of Education approval, the three Project ABC programs be granted exemption from the Carnegie Unit.

2. Opportunity be given for Alberta school jurisdictions to offer Project ABC-type programs which are also granted exemption from the Carnegie Unit.

3. Incentives be provided for school authorities embarking on a Project ABC-type program to support model development.

4. A clearing house for individualized curriculum materials be established.

5. Consideration be given to more frequent administrations of Grade 12 Diploma Examinations during the year to accommodate the needs of students in continuous progress programs.

6. A follow-up study be conducted to determine the success of Project ABC students in post-secondary programs or work environments.

Implications

Implications of Project ABC extend far beyond 1987. In particular, the proposed Alberta School Act fits well with a Project ABC-type model. The proposed legislation allows for program flexibility in terms of time use and also in terms of personalized instruction and continuous progress. It is suggested that any school board may offer an alternative program such as Project ABC. Further, the proposed Directions for Senior High Programs and Graduation Requirement (1987) advanced by Alberta Education allows boards to explore alternatives to the Carnegie Unit provided that students have access to at least minimal required instructional time.

There are other implications for those who have been involved in Project ABC. Teachers who have taught in project schools find that their teaching styles have been permanently altered and their skills enriched. Students have had their learning needs addressed in a number of innovative ways. Some have experienced success

through the provision of additional time. Others have been challenged by enrichment activities they would not have had time for before. Still others have been able to concentrate on areas of weakness while moving more quickly through areas of strength. Many have learned time management skills and have had closer, more satisfying relationships with their teachers. Administrators have been challenged to find innovative solutions to staff development needs, budget constraints, student tracking and record keeping and school leadership problems.

Additional research should evolve from this study to track project students' success in post-secondary or career situations. The School-wide Model could benefit from two more years of student achievement evaluation as the Grade 12 program was operational only in the final year of Project ABC. The impact of the study should be monitored in terms of teacher development over the next five years. There is a lot of follow-up data waiting to be collected to determine the true extent of the impact of Project ABC.

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CHAPTER 1 - PROJECT OVERVIEW

Project ABC: Advancement Based on Competency was a five-year project (1982-1987) funded jointly by Alberta Education and the Calgary Board of Education. Its purpose was to explore alternatives to the Carnegie Unit. This chapter provides an overview of why the project was needed, how the project was established, what its goals were and how it was to be evaluated.

Project Need

Traditionally in high schools, time, credit and achievement were linked with progress. A student had to spend 125 hours in a course and achieve a passing grade in order to receive five credits regardless of the pace at which he mastered concepts or skills. Even if he were able to progress more quickly than the class, he could not, caught as he was in the lock-step format which prevented the enrolment in sequential courses in the same term. Conversely, if he needed more time than the norm, he had to fall back and repeat the complete course even though he only required part of it.

Project ABC provided three Calgary high schools with the opportunity to "break" the Carnegie Unit by removing the fixed time-credit relationship and replacing it with continuous progress based on competency. In this way, the awarding of credit became dependent on individual competency levels rather than "seat time."

The schools involved in the project were William Aberhart High School, John G. Diefenbaker High School, and Ernest Manning High School. Each school developed its own alternative model but they

were united in their goals of exploring personalized learning methodologies and continuous progress delivery systems. The three models were as follows:

> **Department-based Model** - Business Education Program at William Aberhart High School
> **Parallel Core Program Model** - Personalized Education Program (PEP) at John G. Diefenbaker High School
> **School-wide Model** - Personalized and Continuous Education (PACE) at Ernest Manning High School

Project History

In 1980, Alberta Education released two reports exploring the pros and cons of the Carnegie Unit[1] and indicated to school jurisdictions that there might be financial support for the development of high school programs which provided an alternative to it.

Concurrently, high school administrators in the Calgary Board of Education had been wrestling with possible ways to address the needs of dysfunctional students who either were unable to handle the regular program, were significantly underachieving or who were gifted or talented and needed challenges beyond the regular program.[2] As one school administrator put it:

> The frustration we face, given the realities of the System-wide testing, the Carnegie Unit, Department of Education policy, and the winds of the "back to the basics movement," is that there is little opportunity to creatively address the problem of what to do with these students. From our experience here, we suspect that there are possible solutions ranging from curriculum modification, to flexible timetabling and organization, to staff development, to development of true alternative approaches to secondary education.[3]

Based on the recommendation of a Calgary Board of Education report called ***The Unreached or Dysfunctional Youth in the Senior High School,***[4] a task force was established to explore the needs of these students who did not appear to fit in traditional programs and who

would be better served in an alternative learning environment. The task force reviewed alternative programs all over North America focussing on those which had attempted different forms of continuous progress in order to loosen the relationship between time spent and credit awarded.

However, many of the American programs were beginning to fail at that time for a number of reasons. The main problems encountered had included economic restraints, heavy staff workload due to individualization, lack of in-service, poor student tracking systems and insufficient orientation of students and parents.[5] The task force determined that the concept of alternatives to the Carnegie Unit was sound and that viable programs could be established if safeguards were incorporated to deal with the above-mentioned problems.

The Calgary Board of Education approached Alberta Education regarding a potential project and was favorably received. And so the task force accepted submissions from four or five interested schools and selected William Aberhart, John G. Diefenbaker and Ernest Manning High Schools for inclusion in the project. A proposal for a five-year project, 1982-1987, for $999,950 was forwarded to Alberta Education under the title Advancement Based on Competency and received approval. The Calgary Board was to provide 50% of the funding and Alberta Education the other 50%.

Goals

The evolutionary process described which resulted in Project ABC produced two levels of goals - individual school program goals and project goals. The fit between the two would never be complete and engendered some ongoing problems.

The project proposal was based on three major theses:[6]

1. Learning can be more effective if the process is personalized for the student.

2. The quality of achievement can be improved if competence must be demonstrated at every defined intermediate stage of learning.

3. Learning opportunities can be enhanced if access to courses is made more flexible.

Project objectives were outlined as follows:[7]

1. To provide selected students in three Calgary high schools with alternative delivery systems to the traditional time for credit model, for a five-year period.

2. To develop and provide curriculum at the senior high school level which is based on the principles of personalized instruction and continuous progress.

3. To provide staff involved in the project with opportunity to acquire knowledge and develop expertise in the instructional application of personalized learning systems and continuous progress.

4. To develop and/or adapt instructional materials to provide students with personalized learning experiences and tests to measure those experiences.

5. To develop and maintain administrative procedures to manage the learning process, monitor student progress, keep records, and report credits received.

6. To incorporate an ongoing evaluative component into the project in order to provide both annual formative evaluation information as feedback into the planning process, and also a summative evaluation report at the end of the five-year period to measure the success of the project.

7. To provide Alberta Education with information regarding alternatives to time for credit for use in the consideration of province-wide application of these alternatives.

Upon approval of the project, a Steering Committee was struck comprised of Alberta Education representatives from Curriculum and Planning and Research, Calgary Board of Education administrators

representing the Superintendent and Instructional Services, and the Project Director.

The Evaluation

A process of negotiation occurred in the Steering Committee regarding goals for the project evaluation and a number of evaluation goals were identified.[8] The primary goals included the following:

> **To assess the success of project schools in providing students with acceptable alternatives to the time credit relationships expressed in the current Junior and Senior High School handbook where:**
>
> 1. **The student achievement level is as good as or better than achievement levels in both local and provincial programs.**
> 2. **The Alberta Curriculum is adhered to.**
> 3. **Time has been removed as a requirement in awarding credit.**
> 4. **Competency has been made the basis for awarding credit.**

The secondary evaluation goals identified by the committee included the following:

> 5. **To provide project schools with information concerning students' educational experiences in terms of the principles of personalized instruction and continuous progress.**
> 6. **To provide Alberta Education with information regarding adherence to the Alberta Curriculum in project schools.**
> 7. **To provide Alberta Education with information for use in the consideration of province-wide application of alternatives to time credit.**

As well as determining evaluation goals, it was necessary to define some of the key concepts in the project. Again, through the process of negotiation, the committee defined the terms ***personalized instruction*** and ***continuous progress*** for the purposes of

the project. ***Personalized instruction*** was defined to include the following components:

1. Placement appropriate to learning style.
2. Varied learning environments.
3. A "stop mechanism" for students to obtain assistance at any point in a course.
4. Demonstrated competency in each unit in a course before proceeding to the next unit.
5. Opportunities for enrichment.

The concept of ***continuous progress*** was defined to include the following components:

1. A learning rate compatible with ability.
2. Flexible timetabling to accommodate personal choice or need.
3. Advancement based on competency demonstrated rather than time spent in a course.

During the course of the project, school personnel defined the concept of ***competency*** as follows:

> Students must demonstrate a competency level of at least 50% in a unit or course before proceeding to the next unit or course. However, in certain cases, higher competency levels for particular units may be required (e.g., Safety Unit in Chemistry).

As stated in the project goals, an evaluative component was incorporated into yearly activities. A formative evaluation was prepared at the end of each school year which fed the following kinds of information back into the project planning cycle:

1. Academic Evaluation - Comparison of final grades with local and provincial control groups
2. Attitudinal Evaluation - Measurement of project participants' satisfaction and perceptions regarding project activities
3. Contextual Evaluation - Review of a variety of project activities including curriculum, budget, methodology, etc.

In the last year of the project (1986-1987), a policy Delphi study was conducted with a panel of Project ABC teachers and administrators to provide further contextual data for the project evaluation.

Finally, summative evaluation activities were conducted in 1987 to pull the many strands of this complex project together. These activities are recorded in this report. In Chapter 2, the literature relating to the Carnegie Unit is briefly reviewed. In Chapter 3, an outline of study methodology is provided for both formative and summative stages. In Chapter 4, findings are presented which relate to the project as it evolved in each of the the three models. In Chapter 5, summative project-wide findings are reported. And in Chapter 6 some conclusions about project success are drawn, some recommendations advanced and implications for the province discussed.

CHAPTER 2 - PROJECT ROOTS: A REVIEW OF THE LITERATURE

A review of the literature related to the Carnegie Unit and projects which examined it is outlined below along with some brief comments on other project roots.

The Carnegie Unit

The practice of awarding the Carnegie Unit or Unit-of-Credit at the high school level has a history which dates back to the turn of the century. In 1905 the Carnegie Foundation for the Advancement of Teaching was established by Andrew Carnegie primarily to distribute funds to retired professors. In order to determine which institutions were eligible for the funds, the Foundation had to define "college" and "high school." In 1907, it set the standard of 14 units of high school work as the basic minimum for student admission for a college wishing to receive Carnegie pension funds. A standard unit was defined as five hours of related work per week, or five periods of 40 - 60 minutes, for at least 36 weeks. High schools had to accept these standards if they wanted their graduates to be admitted to approved colleges. By 1909, the majority of high schools and colleges across the United States had officially adopted the standards recommended by the Carnegie Foundation.[1]

Although the initial intention of the unit was directed toward the colleges, it soon became a means of developing a uniform standard of quality across high school courses and programs. Undoubtedly its greatest impact has been, and continues to be, upon high schools and their students.

Most provinces in Canada have been influenced by the concept of the Carnegie Unit, although none has adopted it in its entirety. A credit system was introduced in Alberta in 1937 and was phased in over a three-year period. A school day consisted of eight class periods, each of approximately 40 minutes. Thus, 40 periods were available for instruction each week. Most subjects carried a value of five credits; a minimum of 100 credits was required to qualify for a high school diploma.[2]

Today, Alberta high school accreditation is based on both an achievement component and a time component. This time-credit relationship is quite explicit with regard to the awarding of credit and is currently expressed as follows:

> ... one credit requires a minimum of twenty-five hours of instruction time per year or per semester. Hence, a five-credit subject must receive a minimum of one hundred and twenty-five hours of instruction time. This represents approximately one forty-minute period per day, five days per week for every week of the school term (assuming a ten month school year). A three-credit course shall receive not less than 62½% hours of instructional time.[3]

Advantages in the use of the Carnegie Unit as the basis for high school organization have been identified as including the following:

1. Establishes the concept of a three- or four-year high school and the use of a diploma as a requirement for graduation.
2. Establishes the concept of a high school diploma as the basis for entrance to colleges and other post-secondary institutions.
3. Simplifies the preparation of college-bound students.
4. Provides uniformity in time allotments for high school subjects.
5. Is easily understood by principals, teachers, students and parents.
6. Regularizes programming and scheduling.
7. Gives teachers a sense of security about amount of time to cover a given subject or course.
8. Is convenient for academic bookkeeping.
9. Can be used easily to measure the time spent on a subject.
10. Assists in course planning and development.
11. Is universally accepted and encourages the development and maintenance of comparable educational standards across the country.[4]

Disadvantages or criticisms of the Carnegie Unit which have been identified include the following:

1. Emphasizes the evaluation of a student's high school work in terms of how many hours and years he puts into a subject rather than how much knowledge and competence he acquires.
2. Demands rigid requirements in subjects making innovation difficult.
3. Gives undue emphasis to time served rather than to quality of learning and to needs, interests and abilities of the student.
4. Demands all students to earn the same number of credits to graduate and makes no allowance for previous knowledge.
5. Assumes all students can acquire the same amount of knowledge in a given period of time.
6. Credits earned are not necessarily comparable from school to school.
7. Absolute value of credits varies considerably from subject to subject.
8. Assumes that certain academic skills and knowledge are necessary but de-emphasizes life skills.
9. Does not measure affective growth.[5]
10. Poses some hardship on learning disabled students enrolled either full or part time in special programs.[6]

The Eight-Year Study

Of particular relevance for Project ABC is the Eight-Year Study, conducted in the United States half a century ago. It was an ambitious and, from our perspective, idealistic venture which warrants further examination here.

By 1930, the high school was much as it had been in 1910 and was perceived as being restrictive, while the elementary school had an informal atmosphere with varied activities and learning materials. High school staffs felt that they were prevented from making needed improvements because of rigid college requirements. The Great Depression of 1929 resulted in large numbers of young people enrolling in high school because they had nothing else to do. Most did not intend on going on to college and they found little meaning in their high school program. Teachers and administrators

recognized this lack of relevance but at the same time did not want to jeopardize chances of college admission for those who did want to go on. Many favoured a reconstruction of the high school curriculum to meet these conflicting needs.[7]

In October 1930, the Commission on the Relation of School and College was established under the auspices of the Progressive Education Association. Its purposes were as follows:

1. To establish a relationship between school and college that would permit and encourage reconstruction in the secondary school.

2. To find, through exploration and experimentation, how the high school in the United States could serve youth more effectively.[8]

The Commission was concerned with the needs of all high school students, but particularly with those of students planning to go on to college, and sought to establish conditions in schools which would develop in students a strong sense of individual and social responsibility by making school work meaningful and relevant.

The Commission's proposal stated the goal of the study as follows:

> We are trying to develop students who regard education as an enduring quest for meanings rather than credit accumulation; who desire to investigate, to follow the leadings of a subject, to explore new fields of thought; knowing how to budget time, to read well, to use sources of knowledge effectively and who are experienced in fulfilling obligations which come with membership in the school or college community.[9]

The project involved the release of a group of 30 schools from the usual subject and unit requirements for college admission for a period of five years (later extended to eight) beginning with the class entering college in 1936 and therefore beginning high school in 1932. Over 300 colleges and universities across the States complied by waiving the usual entrance requirements, the Commission received generous funding from both the Carnegie Corporation and the General Education Board of the Rockefeller Foundation, and the process of "reconstruction" began.

The "Thirty Schools," as they became known, were selected across the country and represented both public and private schools and large and small ones. They all, however, were schools of "highest character and excellence and established reputation."[10] Each school developed its own plan for reconstruction, deciding what changes should be made in curriculum, organization and procedure. The Commission established a Committee on Evaluation and Recording, directed by Ralph W. Tyler, which provided a great deal of support to the faculties of the Thirty Schools but left to them the freedom and responsibility to initiate change as they saw fit.

Most notable among the changes wrought by schools during the Eight-Year Study were the following:

Curriculum	School-determined curriculum
	Greater unity and continuity among courses and subjects
	Increased relevance of subject matter to adolescents
	Variety of student products instead of tests and examinations
	Encouragement to pursue areas of interest
	Increased challenge for gifted students
	Greater stress on the arts, philosophy, logic, rules for discussions, problem solving and critical thinking
Delivery	Student-centered instruction
	Variety of methods such as small group and independent as well as large group activities
	Use of a variety of resources instead of reliance on a text
	Increased use of the school library
	Use of the community as a demonstration laboratory

	Increased individual student attention and guidance
	Use of the teacher as a counsellor in a homeroom setting (sometimes daily for up to three years)
Administration	Democratic decision-making processes in both the school and the classroom
	Increased need for joint planning by teachers
	Increased teacher self-esteem through involvement in decision making and their own personal and professional growth
	Increased parent involvement
	Consideration of the role of the school in the community
	Better relations with colleges and universities
Evaluation	Careful recording, reporting and measurement of results
	Feeding of evaluation findings into the planning cycle
	Development of a variety of non-traditional evaluation instruments that went beyond the measurement of skill and knowledge acquisition

Tyler directed a follow-up study which pursued students' careers in college once they had graduated from the experimental schools. A group of 1475 students was meticulously paired with non-experimental school graduates in 25 of the participating colleges and the records of both groups were tracked. Sources of information included official college records, lists of honours and prizes, reports from instructors, samples of written work, results of college tests and annual student questionnaires and interviews.

A comparison of the 1475 matched pairs disclosed that graduates of the Thirty Schools:

1. Earned higher grade averages in all subject fields except foreign languages.

2. Received slightly more academic honours each year.

3. Were more often judged to be motivated, systematic, objective, resourceful and aware.

4. Participated more frequently in and were more appreciative of the arts.

5. Participated in more organized student groups (except religious and service groups) and earned a higher percentage of non-academic honours.[11]

Further analysis by sub-group showed that the graduates from the six schools which had made the most marked departures from conventional approaches were strikingly more successful when compared with their counterparts than students from the six schools which had made the least changes.[12] This difference was expressed in study findings as similar to a score of 27 to 7 for the least conventional schools compared to their controls and a score of 14 to 16 for the most conventional schools compared to their controls.[13] A committee of college officials examined study findings and concluded:

> The results of this study seem to indicate that the pattern of preparatory school program which concentrates on a preparation for a fixed set of entrance examinations is not the only satisfactory means of fitting a boy or girl for making the most out of the college experience. It looks as if the stimulus and the initiative which the less conventional approach to secondary school education affords sends on to college better human material than we have obtained in the past.[14]

The Eight-Year Study Chairman, Wilford M. Aikin, concluded:

1. The graduates of the Thirty Schools were not handicapped in their college work.

2. Departures from the prescribed pattern of subjects and units did not lessen the student's readiness for the responsibilities of college.

3. Students from the participating schools which made most fundamental curriculum revision achieved in college distinctly higher standing than that of students of equal ability with whom they were compared.[15]

He saw these conclusions as having two profound implications. The first was that traditional school-college relations were unsound because emphasis was placed on such outworn symbols as units, grades, rankings and diplomas.[16] The second was that secondary schools could be trusted with more freedom than college requirements had permitted to that time.[17]

The direct impact of the Eight-Year Study on secondary education was disappointing. Although teachers involved in the study used the findings in their own work, administrators and school boards did not pursue study implications. According to Tyler himself, virtually no attempt was made to publish study conclusions apart from the five-volume report which was published in 1942.[18] This was because the involvement of the United States in World War II had an adverse effect on the potential dissemination and influence of study findings.[19]

Indirectly, however, the study had a number of significant outcomes. Tyler identified a number of them as follows:

1. Widespread acceptance of the idea that schools could develop programs which would interest their students and still prepare them for success in college.

2. Recognition by colleges that high school graduates need not meet specific subject requirements.

3. The freeing of high schools from the heavy dominance of college entrance requirements in program development.

4. The development of the in-service workshop to assist teachers in developing instructional programs and materials.

5. Wide acceptance of the concept of educational evaluation as a procedure for appraising the attainment of the objectives of an educational program which superseded the narrower concept of testing to assess programs and student progress.

6. The recognition by educators of the value of defining educational objectives in terms of the behaviour patterns students are encouraged to acquire.[20]

Further, Guba and Lincoln point out that Tyler's rational and elegant evaluation process based on objectives was a major step forward for the fledgling field of educational evaluation, although it has since been superseded by more naturalistic approaches.[21] In addition, this major research project provided experience for a number of influential figures in the fields of education, evaluation and psychology, including Benjamin Bloom, Bruno Bettelheim, and Lee J. Cronbach. Among the many teachers who took part in the project was J. Lloyd Trump, who will be referred to later in the chapter.

Study weaknesses included the following, as identified by Tyler:

1. Design biased in favour of the experimental schools.
2. Locally determined objectives concurred "rather remarkably" with those of the central evaluation staff.
3. More interest in experimentation with teaching and counselling practices rather than in the study's ostensible goals.[22]

In addition, it must be pointed out that the study focussed on the one in six high school students who went on to college. It made no attempt to track the impact of "reconstruction" on those who went to work.

However, the study remains an educational benchmark, demonstrating the professionalism and courage of those educators fifty years ago who challenged the status quo and proved that there was more than one "right" way to educate adolescents.

Other Project Roots

Two other educational concepts embodied in Project ABC are individualized instruction and continuous progress. As well, one particular man, namely J. Lloyd Trump, was influential in the

development of project concepts. Each of these is explored briefly below.

Individualized Instruction

Frederic Burk, President of the San Francisco Normal School in the teens of this century was greatly impressed with individual differences among school children.[23] He developed the concept of self-instructional materials to enable classmates to work on different assignments at different rates. Two of his staff members, Carleton Washburne and Helen Parkhurst, moved on to jobs in different parts of the country taking the idea with them. Each developed and published plans for individualizing instruction. These plans became widely known and influenced many teachers and schools to use workbooks and other forms of self-instructional materials.

In 1919, Washburne identified two separate parts to the curriculum: common essentials and group and creative activities. Common essentials involved the use of largely self-instructional activities on which the student worked at his own rate, then testing himself for mastery and, if successful, following that up with a test provided by the teacher. If he passed the test, he went on to the next unit; if he did not, he had a conference with the teacher who provided guidance and more independent work. In the group and creative activities, students had individual responsibilities. Grouping was based on age and social maturity.

Parkhurst founded an elementary and high school for crippled children, also in 1919. She emphasized the provision of opportunities for each student to pursue interests, to study at their own rate and to live constructively and cooperatively. Learning contracts were employed in which students could select interest areas, identify parameters and set the pace. Students were required to complete each unit before going on to a more advanced one.

These two plans were very influential in the 1920s and 1930s. Major innovations included:

1. Use of workbooks to provide relevant practice materials.
2. Recognition of both knowledge acquisition and socialization as functions of the school.
3. Grouping procedures which did not stigmatize slow learners.
4. Procedures for providing for individual differences in learning rates and in special interests.

Continuous Progress

The concepts of individualized instruction and continuous progress work together because once students are released from lock-step instruction, traditional groupings break down. Various forms of continuous progress have been evident for most of the century as indicated earlier.

In Canada in recent times, continuous progress has been an alternate delivery system in a number of schools. The Ontario Teachers' Federation published a case book on continuous progress schools in 1972.[24] This study examined 11 different Ontario schools from elementary to high school which were working on forms of continuous progress at that time. Each school had certain characteristics which differentiated it from the others as programs responded to community needs. Each was at a different level of implementation; however, they each operated with fixed curricula and standardized textbooks. Similarities noted included the following:

1. Organizational capacity to adapt to a new concept.
2. Belief in continuous progress as an ideal educational philosophy.
3. Acceptance of the concept wholeheartedly by the school staff.
4. Pupils grouped according to ability, interest and age.

5. Greater use of field work, individual research, the school library and audio-visual aids.

6. Need for individualized work areas hampered in several schools by lack of space or inappropriate building design.

7. Need for new methods of reporting to parents.[25]

In Alberta, continuous progress has been implemented for a number of years in M. E. Lazerte High School in Edmonton, Sir Winston Churchill High School in Lethbridge, and Bishop Carroll High School in the Calgary Catholic School District.

J. Lloyd Trump

J. Lloyd Trump developed an interest in educational innovations when he was working on curriculum development for a new consolidated twelve-grade school in 1929. During the 1930s, he taught in one of the Thirty Schools of the Eight-Year Study. In 1961, he became a staff member for the National Association of Secondary School Principals and since then has directed four nation-wide studies.[26]

One of these studies was the Model Schools Project, a five-year project which later expanded to eight years. It was funded by the Danforth Foundation in 1968 to demonstrate that students' educational opportunities would be enhanced when a variety of educational innovations was coordinated over several years with improved methods of program evaluation.[27] Between 32 and 34 schools participated in the project for varied lengths of time, most of which were in the United States. However, one school was in Germany and another was Bishop Carroll High School in Calgary.

Bishop Carroll has been offering a continuous progress, individualized approach since 1971.[28] Program highlights include the following:

1. A continuous progress approach to instruction with emphasis on independent study for all students;

2. A school building, designed for the new approach to education, which does not include traditional classrooms;

3. A Teacher-Advisor Program tied directly to individualized independent study;

4. Teachers working in teams and aided by a large support staff;

5. A modularized curriculum divided into seven areas of knowledge with graduation requirements in each; and

6. Flexible student scheduling, including opportunities for off-campus learning experiences for credit.

Trump also directed the NASSP Commission on the Experimental Study of the Utilization of Staff. Frequently referred to as the Trump Plan, the Commission recommended the division of a student's time into 40% independent study, 40% small group activity and 20% large group activity. The plan has been used most frequently with above average students[29] and few schools have met the Commission's recommended division of time[30], but some of the Trump Plan features have been incorporated widely, including innovative school designs to accommodate varied types of instruction.

Trump also co-authored a text on improving secondary school curricula, taking the above-mentioned concepts into account.[31] Among other innovations he addresses the non-graded, continuous progress school and suggests the following:

> For maximum curriculum improvement, the non-graded school must use team teaching, flexible scheduling, technical devices, and the teaching-learning methods ...that deal(t) with independent study, large-group instruction, and small-group discussion. It must also adapt to the socioeconomic, political, cultural, and other characteristics of the areas where its students live. ...The non-graded school negates student frustration because it lessens the pressure for conformity. Students are comfortable with a peer group with whom success is a distinct possibility ... [and] enhances the possibility of individualized learning.[32]

This search for Project ABC roots reveals some startling findings. This educational innovation is actually based on concepts which have been evident in the field of education for over fifty years.

The Carnegie Unit was initially established for the distribution of college pension funds, but it has come to regulate our high school system. By 1930, it was considered outdated and restrictive. Individualized instruction was experimented with as early as 1919 and with it came the ideas of varied learning rates, continuous progress, mastery learning, student-centered curriculum, advancement based on competency and learning contracts. The Eight-Year Study, commencing in 1932 and advancing far beyond the parameters of Project ABC, followed its students through their university careers. It proved that non-standardized curricula and the removal of time and credit requirements not only did not hinder students' success in college, these actually enhanced students' success in both academic and non-academic pursuits.

Experimental continuous progress schools have been in Canada in recent times since 1971. Each experimental school is organized somewhat differently to meet local needs but they all share a number of similar characteristics, as follows:

1. Deletion of a number of restrictive practices which group or categorize students, such as the Carnegie Unit, credits, and grades.
2. Student grouping arrangements based on student similarities or interests.
3. Broader-ranging, more student-centered curriculum.
4. Greater variety of instructional methods such as small groups, large groups, independent study and field trips.
5. Continuous progress.
6. Individualized instruction.
7. Increased student and teacher satisfaction.
8. Strong staff commitment.
9. Improved communication with parents.
10. Greater focus on appropriate evaluation, both for students and for programs.

One final characteristic which appears to be evident but which lacks firm documentation is that of improved student achievement at the secondary level. Project ABC attempts to address this issue by making it a research topic.

CHAPTER 3 - DESIGN AND METHODOLOGY

The design and methodology employed in Project ABC for both formative and summative evaluation studies is outlined in this chapter along with some comments on study problems and limitations.

Overview

The purpose of the evaluation of Project ABC was to assess the success of project schools in providing students with acceptable alternatives to the traditional time-credit relationship expressed by the Carnegie Unit. This was achieved through a two-tiered approach to evaluation which involved both a formative and summative design.

For each of the five years of the project (1982-1987), a cycle of formative evaluation activities was conducted, culminating in an annual Formative Evaluation Report produced in the autumn following each school year. The formative report presented annual findings of model progress toward project goals and also served as a feedback mechanism for school administrators and staff regarding the affective response of project participants. These reports were for internal consumption only due to the temporary nature of findings related to an evolving project, and circulation was limited to project participants and Steering Committee members.

The summative evaluation activities which are reported here rely heavily on the five years of data collected between 1982 and 1987 but the focus is different. In this document conclusions are drawn about project success from a provincial perspective. Over-

riding questions to be answered include the following: Are there viable alternatives to the Carnegie Unit? Is the concept of advancement based on competency a sound one? Should school systems incorporate advancement based on competency as an alternative for their students? In order to focus on these and other critical questions, data from the five years of the project are either summarized or key items extracted for analysis to provide a global review.

Scope

To guide the design of the study, the following nine research questions were posed:

1. What changes occurred in the achievement of project students during the course of the project?
2. How did achievement levels of project students compare with those of non-project students within the school, within the system and within the province?
3. Did the curriculum offered to project students adhere to the curriculum requirements of Alberta Education?
4. To what extent was time removed as a requirement for obtaining credit?
5. To what extent was competency established as the requirement for obtaining credit?
6. Were the alternatives to the time credit relationship as implemented in Project Schools educationally and financially sound?
7. In what way and to what extent was instruction personalized for project students?
8. In what way and to what extent was student progress continuous?
9. Were teachers provided with appropriate resources, developmental activities, guidance and support in order to implement the project?[1]

The study was limited to students, teachers and administrators in the three project schools, William Aberhart, John Diefenbaker, and Ernest Manning, and to students and teachers in the control groups, one at John Diefenbaker, the other at Sir Winston Churchill. In addition, the mean scores of all Calgary Board of Education students and all Province of Alberta students were used for comparison purposes in appropriate courses.

Evaluation activities, whether formative or summative, were of three main types, as follows:

1. *Academic Evaluation*

   The evaluation of student achievement levels in Project ABC provided critical data regarding student success in the project compared with regular programs. It was necessary to substantiate the belief of project staff that students would be at least as successful, if not more so, than regular program students. Therefore, final grades were compared, whether they were teacher-based or blended (as in the case of Grade 12 courses where Diploma Examinations provide 50% and teachers the other 50%). Control groups varied from model to model, but all project students' final grades were compared with Calgary Board of Education and Province of Alberta mean grades to determine if significant differences existed.

2. *Attitudinal Evaluation*

   Of equal importance was the need to know if project participants' attitudes reflected greater satisfaction than those of control groups if individual learning styles and learning rates were acknowledged. To this end, a set of questionnaires was developed which employed a Likert-type scale and measured attitudes towards and perceptions about the project. These were administered annually or semi-annually to project and control students, project and control teachers and project

administrators. Comparisons were made within each model and between model groups and their control groups to determine if significant differences in attitudes and perceptions existed.

3. *Contextual Evaluation*

A flexible third component was built into the study to allow a quick reaction to changing project needs. A variety of annual contextual activities included such things as classroom observation, curriculum validation by Alberta Education curriculum consultants, and a budget review. However, probably the most critical annual contextual activity was the interview process involving a sample of project participants. As the study progressed, this responsive mechanism became more and more important.

Contextual activities which evolved out of project needs included the examination of time on task at Diefenbaker in 1984-1985 and the collection of student tracking data at Aberhart and Manning from 1985-1987.

In order to shed light on the multiplicity of goals, objectives, research questions and key concepts engendered by this project, a table has been prepared to identify congruence or the lack of it among goal topics as perceived by different stakeholder groups. (Consult Table 1.) The table also identifies whether the five Formative Evaluation Reports or this Summative Evaluation Report addresses each topic.

The table highlights the schools' focus on the concepts of personalized instruction and continuous progress in contrast to the Steering Committee's main focus on student achievement, curriculum adherence, removal of time as a credit requirement and its replacement with competency as the basis for awarding credit.

TABLE 1

EVALUATION GOALS FOR PROJECT ABC
BY STAKEHOLDER GROUP

GOAL TOPIC	PROJECT OBJECTIVES (Project Proposal)	EVALUATION GOALS (Steering Committee)	RESEARCH QUESTIONS (Researcher)	KEY CONCEPTS	STUDY OUTPUT
Purpose	To provide selected students in three Calgary high schools with alternative delivery systems to the traditional time for credit model, for a five-year period.	To assess the success of project schools in providing students with acceptable alternatives to the time credit relationship expressed in the current Junior and Senior High School Handbook where:	Were the alternatives to the time credit relationship as implemented in project schools educationally and financially sound?		**Summative Report**
Student Achievement		a) The student achievement level is as good as or better than achievement levels in both local and provincial programs.	1. What changes occurred in the achievement of project students during the course of the project? 2. How did achievement levels of project students compare with those of non-project students within the local system and within the province?		**Formative Reports 1-5** **Summative Report**

TABLE 1

EVALUATION GOALS FOR PROJECT ABC
BY STAKEHOLDER GROUP (continued)

GOAL TOPIC	PROJECT OBJECTIVES (Project Proposal)	EVALUATION GOALS (Steering Committee)	RESEARCH QUESTIONS (Researcher)	KEY CONCEPTS	STUDY OUTPUT
Curriculum Adherence		b) The Alberta Curriculum is adhered to. To provide Alberta Education with information regarding adherence to the Alberta Curriculum in project schools.	Did the curriculum offered to project students adhere to the curriculum requirements of Alberta Education?	Content match Standards comparability	Formative Reports 1-5 Summative Report
Removal of Time as a Credit Requirement		c) Time has been removed as a requirement in awarding credit.	To what extent was time removed as a requirement for obtaining credit?	Stop mechanism Learning rate compatible with ability Flexible entrance to next course level	Summative Report
Competency as Basis for Awarding Credit		d) Competency has been made the basis for awarding credit.	To what extent was competency established as the requirement for obtaining credit?	Test use at the unit level Demonstrated competence before proceeding to the next unit Advancement based on competency, not time	Summative Report

TABLE 1

EVALUATION GOALS FOR PROJECT ABC
BY STAKEHOLDER GROUP (continued)

GOAL TOPIC	PROJECT OBJECTIVES (Project Proposal)	EVALUATION GOALS (Steering Committee)	RESEARCH QUESTIONS (Researcher)	KEY CONCEPTS	STUDY OUTPUT
Personalized Instruction and Continuous Progress	1. To develop and provide curriculum at the senior high school level which is based on the principles of personalized instruction and continuous progress. 2. To provide staff involved in the project with opportunity to acquire knowledge and develop expertise in the instructional application of personalized learning systems and continuous progress. 3. To develop and/or adapt instructional materials to provide students with personalized learning experiences and tests to measure those experiences.	To provide project schools with information concerning students' educational experiences in terms of the principles of personalized instruction and continuous progress.	1. To what extent and in what ways was instruction personalized for project students? 2. To what extent and in what ways was student progress continuous?	Personalized Instruction: a) Placement appropriate to learning style b) Varied learning environments c) Stop mechanism d) Demonstrated competence of each unit in a course before proceeding to the next unit e) Opportunities for enrichment Continuous Progress: a) A learning rate compatible with ability b) Flexible timetabling to accommodate personal choice or need c) Advancement based on competency rather than time spent	**Formative Reports 1-5**
Administrative Procedures	To develop and maintain administrative procedures to manage the learning process, monitor student progress, keep records, and report credits received.				**Formative Reports 1-5**

TABLE 1

EVALUATION GOALS FOR PROJECT ABC
BY STAKEHOLDER GROUP (continued)

GOAL TOPIC	PROJECT OBJECTIVES (Project Proposal)	EVALUATION GOALS (Steering Committee)	RESEARCH QUESTIONS (Researcher)	KEY CONCEPTS	STUDY OUTPUT
Teacher Support			Were teachers provided with appropriate resources, developmental activities, guidance and support in order to implement the project?		Formative Reports 1-5
Project Evaluation	To incorporate an ongoing evaluative component into the project in order to provide both annual formative evaluation information as feedback into the planning process, and also a summative evaluation report at the end of the five-year period to measure the success of the project.				Formative Reports 1-5 Summative Report
Province-wide Application	To provide Alberta Education with information regarding alternatives to time for credit for use in the consideration of province-wide application of these alternatives.	To provide Alberta Education with information for use in the consideration of province-wide application of Project ABC-type programs.			Summative Report

The broader terms of personalized instruction and continuous progress were addressed in the five Formative Evaluation Reports in order to provide feedback to the schools, while the more specific variables of time use and demonstrated competence were reserved for this final report to Alberta Education.

The remainder of this chapter will outline the design and methodology employed in both formative and summative evaluation activities and will close with a note about the policy Delphi study and discussion of problems and limitations encountered in the study.

Formative Evaluation

The five annual Formative Evaluation Reports provided feedback to the project schools on student achievement, curriculum adherence, personalized instruction, continuous progress, administrative procedures and teacher support.

The methodology employed in the formative evaluation with regard to sampling procedures, control groups, design, data collection and data analysis is outlined below.

Sampling Procedures

Student participants in the study were selected annually according to the nature of the model employed by each of the project schools. As a result, each population was handled somewhat differently as is outlined below.

Department-based Model	All Grade 11 and Grade 12 students who had completed two Business Education courses in Grade 10 and who were currently enrolled in at least one Business Education course.
	Similar Control group selection.[2]

Parallel Core Program Model	All students registered in PEP in Grade 10.
	Control group selection, also in Grade 10, based on course registration patterns similar to those of PEP students.
School-wide Model	All registrants in courses selected according to the school timetable.
	No control group.

Interviews were conducted annually with a 10-20% sample of project students registered in the second semester.

All teachers of the above students were surveyed annually with attitude questionnaires and teachers of project students were also interviewed. Senior administrators, program heads and guidance counsellors in project schools were surveyed annually. Senior administrators and program heads were also interviewed annually.

Initially, parents were included as a respondent group but after one year of the project they were deleted due to both the paucity of information gained and their low response rates.

Control Groups

Again, control groups varied from model to model. Sir Winston Churchill High School (Calgary) was selected to provide control groups of Business Education students because, in the view of Aberhart staff, the school served a comparable population and provided what might be termed a traditional Business Education program.

Students who were not in the project provided control groups at Diefenbaker. Staff felt that this would supply the most useful data because the school environment was identical and tests used by teachers were the same for both groups.

At Manning, initially, there was an attempt to identify both project and control students but by the fourth year of the project the definition of PACE had been broadened to include all students in the school and so the control group concept was eliminated.

In addition, as mentioned above, all Calgary Board of Education and Province of Alberta students were employed to provide mean scores for academic comparisons.

Design

The nature of each model necessitated the development of a different evaluation design. (Consult Table 2.)

In the Department-based Model, once the sample was selected, a baseline comparison of students' final grades was conducted to establish if differences existed between project and control groups. In all, four groups of students were examined in the project.

In the Parallel Core Program Model an attempt was made to collect some baseline data about project and control students through a comparison of their results on the Grade 9 city-wide tests used by the Calgary Board of Education. Unfortunately, after one year of the project these tests were deleted. In all, three groups of project and control students were tracked throughout their three years of high school.

The School-wide Model was by far the largest of the three models and not surprisingly took the longest to get underway. Although a few isolated courses were examined in 1982-1983, it was not until 1984-1985 that a full complement of courses at the Grade 10 level was available for examination. Only this group could be tracked to completion of Grade 12 by 1987, although another group was tracked to the end of Grade 11.

TABLE 2

MODEL-BASED DESIGN OF FORMATIVE EVALUATION

PROJECT ABC

1982-1987

YEAR / MODEL	0 1981-82	1 (Pilot) 1982-83	2 1983-84	3 1984-85	4 1985-86	5 1986-87
DEPARTMENT-BASED MODEL	Baseline	GROUP 1 (Grade 11) Baseline	GROUP 1 (Grade 12) GROUP 2 (Grade 11) Baseline	GROUP 2 (Grade 12) GROUP 3 (Grade 11) Baseline	GROUP 3 (Grade 12) GROUP 4 (Grade 11)	GROUP 4 (Grade 12)
PARALLEL CORE PROGRAM MODEL	Baseline	GROUP 1 (Grade 10)	GROUP 1 (Grade 11) GROUP 2 (Grade 10)	GROUP 1 (Grade 12) GROUP 2 (Grade 11) GROUP 3 (Grade 10)	GROUP 2 (Grade 12) GROUP 3 (Grade 11)	GROUP 3 (Grade 12)
SCHOOL-WIDE MODEL			GROUP 1 (Math & Typing)	GROUP 1 (Math & Typing) GROUP 2 (Grade 10)	GROUP 1 (Math & Typing) GROUP 2 (Grade 11) GROUP 3 (Grade 10)	GROUP 2 (Grade 12) GROUP 3 (Grade 11)

Instrumentation

The questionnaire format in the first year of the project was different for each of the respondent groups, as the following topic list indicates:

Student Questionnaire	General Information IAR Scale (Intellectual Achievement Responsibility Scale) Learning Activities Description Student Satisfaction Scale
Parent Questionnaire	General Information Learning Activities Description Parent Satisfaction Scale
Teacher Questionnaire	General Information Concerns Questionnaire (CBAM) Learning Activities Description Teacher Facet Satisfaction Scale
Administrator Questionnaire	General Information Administrator Rating Scale

A number of factors provided impetus for revising the instruments. The severe time constraints under which the instruments had been developed had limited pre-testing. Feedback from respondents tended to be negative. Analysis and compilation of results proved to be very difficult. It was the view that information collected was too diffuse.

Therefore, the Steering Committee decided that the first year of the evaluation be designated a pilot study. The instruments were then subjected to stringent factor and content analysis. In addition, by this time, the evaluation goals had been finalized. And so it was possible to develop a Data Collection Matrix and a set of questionnaires which were coded for cross-referencing and interpretation ease. (Consult Table 3.) This matrix then provided the structure for the remainder of the formative evaluation with the addition of two items related to student interaction in 1985 at the request of a Calgary Board of Education trustee. (Samples of the revised instruments are available in Appendix 5.)

TABLE 3[3]

DATA COLLECTION MATRIX, FORMATIVE EVALUATION

PROJECT ABC

1982-1987

DATA NEEDS	DATA SOURCE
1.00 Achievement Levels 1.10 Achievement Data 1.20 Satisfaction with Achievement	Final Grades - Project, City, Province
2.00 Coverage of Alberta Curriculum 2.10 Staff Satisfaction with Coverage of Alberta Curriculum 2.20 Alberta Education Curriculum Evaluation Reports	Curriculum Evaluation Report Alberta Education Consultants
3.00 Removal of Time Requirement 3.10 Competency as the Criterion for Awarding Credit	Deleted - see 5.30 and 4.40
4.00 Personalized Learning Alternative 4.10 Placement Appropriate to Learning Style	Questionnaires - Students, Teachers, Administrators Interviews - Students, Teachers, Administrators On-site Observation

T A B L E 3

DATA COLLECTION MATRIX, FORMATIVE EVALUATION (continued)

PROJECT ABC

1982-1987

DATA NEEDS	DATA SOURCE
4.00 Personalized Learning Alternative (continued) 4.20 Varied Learning Environments 4.30 Stop Mechanism 4.40 Demonstrated Competence for Each Unit 4.41 Test Use 4.42 Competence Demonstrated Before Proceeding to Next Unit 4.50 Enrichment Opportunities	Questionnaires - Students, Teachers, Administrators Interviews - Students, Teachers, Administrators On-site Observation
5.00 Continuous Progress Alternative 5.10 Learning Rate Compatible with Ability 5.20 Flexible Timetabling 5.21 Flexible Entrance to Next Course Level 5.22 Flexible Day 5.30 Advancement Based on Competency, Not Time	Questionnaires - Students, Teachers, Administrators Interviews - Students, Teachers, Administrators On-site Observation, Attendance at School Meetings, Review of School Records, etc.

TABLE 3

DATA COLLECTION MATRIX, FORMATIVE EVALUATION (continued)

PROJECT ABC

1982-1987

DATA NEEDS	DATA SOURCE
6.00 Affective Response to Project 6.10 Satisfaction (Student) 6.11 With Organization of Program 6.12 With Challenge for Students *6.13 With Number of Students Known 6.20 Satisfaction (Teacher) 6.21 Sense of Achievement 6.22 Recognition 6.23 Staff Morale 6.30 Satisfaction (Administrator) 6.40 Communications 6.41 Teacher-Student 6.42 Teacher Interest in Students 6.43 School-wide Communication (Teacher) *Added in 1985	Questionnaires - Students, Teachers, Administrators Interviews - Students, Teachers, Administrators On-site Observation, Informal Meetings, etc.

TABLE 3

DATA COLLECTION MATRIX, FORMATIVE EVALUATION (continued)

PROJECT ABC

1982-1987

DATA NEEDS	DATA SOURCE
6.00 Affective Response to Project (continued) 6.40 Communications (continued) 6.44 Communications about ABC (Administrator) 6.45 Teacher-Teacher *6.46 Student-Student	
7.00 Resource Use 7.10 Money 7.11 Materials 7.12 Library Resources 7.13 Aides 7.14 Equipment 7.20 Time 7.21 Preparation Time 7.22 Release Time * Added in 1985	Questionnaires - Students, Teachers, Administrators Interviews, Students, Teachers, Administrators Budget Review - Review of Documents, Interview with Project Director

Due to an administrative decision at Sir Winston Churchill High School in 1983, several critical items related to personalized instruction and continuous progress were deleted from their versions of the questionnaires. This weakened the value of their contribution as a control group and necessitated the development of a special abbreviated set of questionnaires for administration in that school.

Model-specific interview formats were developed on an annual basis according to issues identified in the analysis of questionnaire results. This process is elaborated below.

A course evaluation format was developed for Alberta Education consultants in their role as validators of project coverage of the Alberta curriculum. Two questions were posed for each course, as follows:

1. Does the content of this course match the Program of Studies for Senior High School?

2. Are the standards applied in this course comparable to those applied generally across the province?

The consultants reviewed each of the project courses annually and submitted their evaluations.

Data Collection

For the purposes of academic evaluation, the mean scores for project, control and system students were collected annually with the assistance of Computing Services, Calgary Board of Education with a specially designed program which searched students' cumulative records for appropriate course scores. Mean scores for Province of Alberta students were collected with the assistance of Computer Services, Alberta Education with a similar specially-designed program to retrieve and calculate final mean grades.

For the attitudinal evaluation component, questionnaires were administered to students at Aberhart, Churchill and Manning on a semester basis in order to poll all appropriate course registrants in each sample. As Diefenbaker is a non-semestered school, questionnaires were administered in the second semester each year. At that time, teacher and administrator questionnaires were also administered to study participants. Over the life of the project, a total of 7,953 questionnaires were completed and returned. (Consult Table 4.)

A sequential data collection process was developed to enrich study findings. (Consult Figure 1.) Once the questionnaires were analyzed and significant differences among respondent groups determined, model-specific issues were identified which required clarification. These issues became the basis of interview questions, again model-specific. Each set of interviews was analyzed before questions were formulated for the next set so that it was possible to sharpen the focus on issues and in some cases clarify them completely.

A number of contextual evaluation activities took place annually. Alberta Education consultants validated the curriculum annually. Courses which received scrutiny varied with the model and year. (Consult Table 5.)

The annual budget review was conducted by means of a document review and a meeting with the Project Director. He prepared an annual budget of proposed and actual expenditures on a school-by-school basis and also produced an updated summary budget by year and category.

TABLE 4

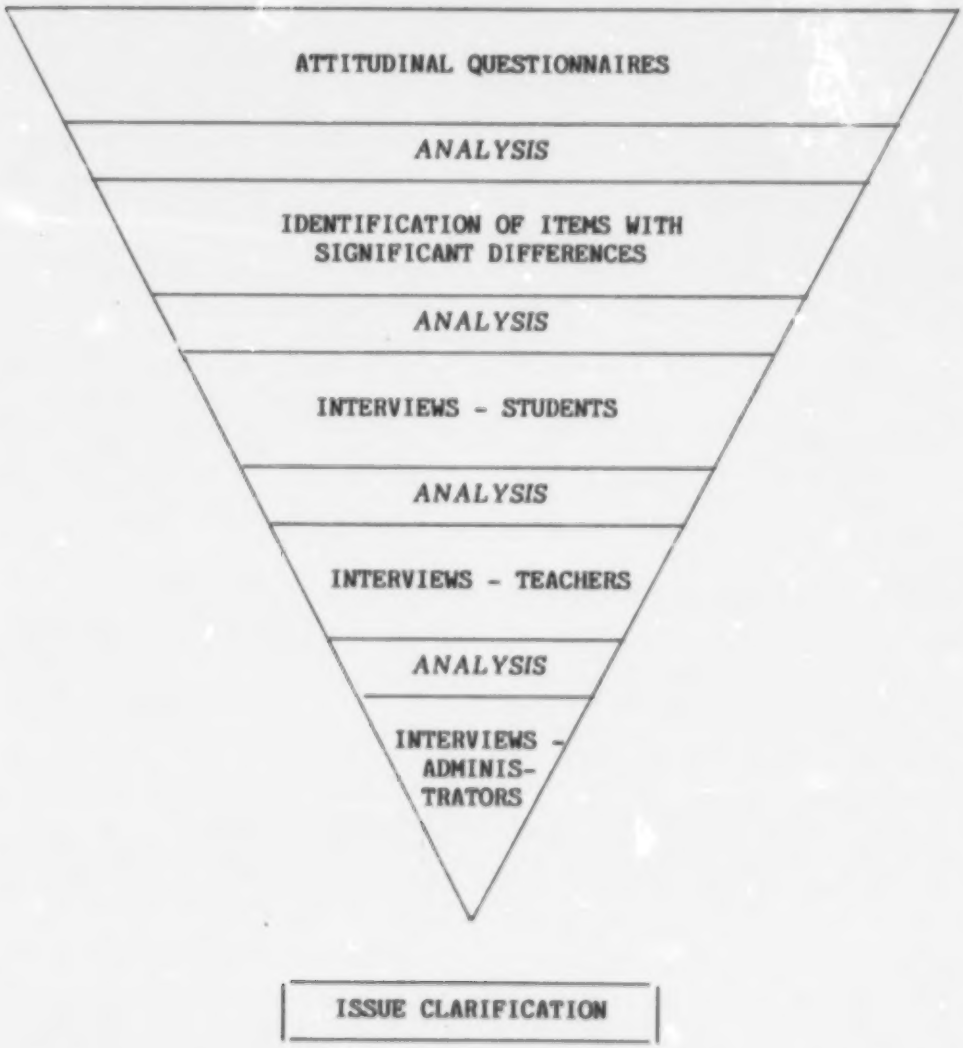
QUESTIONNAIRE RESPONDENTS

PROJECT ABC

1982-1987

MODEL AND GROUP	1982-83	1983-84	1984-85	1985-86	1986-87	TOTAL
DEPARTMENT-BASED MODEL						
Students (P)	115	219	121	118	23	
Students (C)	109	240	225	169	44	
Teachers (P)	7	6	6	5	5	
Teachers (C)	9	10	9	7	5	
Administrators	3	6	6	6	4	
Parents	43					
	286	481	367	305	81	1520
PARALLEL CORE PROGRAM MODEL						
Students (P)	90	142	192	115	57	
Students (C)	98	157	199	101	29	
Teachers (P)	6	8	10	8	11	
Teachers (C)	4	5	9	8	9	
Administrators	7	6	8	8	6	
Parents	55					
	260	318	418	240	112	1348
SCHOOL-WIDE MODEL						
Students (P)	544	417	792	1004	1587	
Students (C)			579			
Teachers (P)	35	8	12	11	14	
Teachers (C)						
Administrators	10	4	12	11	12	
Parents	33					
	622	429	1395	1026	1613	5085
TOTAL	1168	1228	2180	1571	1806	7953

KEY - (P) Project Group
- (C) Control Group



F I G U R E 1

SEQUENTIAL DATA COLLECTION PROCESS
FOR ISSUE CLARIFICATION

PROJECT ABC

1982-1987

TABLE 5

COURSES VALIDATED BY ALBERTA EDUCATION CURRICULUM CONSULTANTS, PROJECT ABC

1982-1987

MODEL	1982-83	1983-84	1984-85	1985-86	1986-87
DEPARTMENT-BASED MODEL	Typing 20, 30 Accounting 20, 30 Law 20, 30 Data Processing 20	Typing 20, 30 Accounting 20, 30 Law 20, 30 Business Procedures 20 Office Procedures 30 Business Machines 30	Typing 20, 30 Accounting 20, 30 Law 20, 30 Office Procedures 20, 30 Business Communications 20 Business Calculations 20	Typing 20, 30 Accounting 20, 30 Law 20, 30	Typing 30 Accounting 30 Law 30
PARALLEL CORE PROGRAM MODEL	Humanities Mathematics Science	Humanities 10, 13, 20, 23 Math 10, 13, 15, 20, 23, 25	Humanities 10, 13, 20, 23, 30, 33 Math 10, 13, 20, 23, 30, 33 Biology 10, 20, 30 Chemistry 10, 20, 30 Physics 10, 20, 30 Science 35	Humanities 20, 23, 30, 33 Mathematics 20, 23, 30, 33 Biology 20,30 Chemistry 20, 30 Physics 20, 30	Humanities 30, 33 Math 30, 33 Biology 30 Chemistry 30 Physics 30
SCHOOL-WIDE MODEL		Math 10, 13 Typing 10, 20, 30 Accounting 10, 20 Law 20 Computer Processing 10	Math 10, 13, 20, 23 English 10, 13 Social Studies 10 Biology 10 Chemistry 10 Physics 10 Typing 20, 30 Accounting 10, 20 Drafting 12 Building Construction 12 Mechanics 12	Math 10, 13, 20, 23, 30, 33 English 10, 13, 20, 23 Social Studies 10, 20 Biology 10, 20 Chemistry 10, 20 Physics 10, 20 Typing 10, 20, 30 Accounting 10, 20 Food Studies 10/20 Psychology 20 Art 10, 20, 30 Visual Communication 12 Commercial Art 15, 25a, 25b, 25c	Math 10, 13, 20, 23, 30, 33 English 10, 13, 20, 23, 30, 33 Social Studies 10, 20, 30 Biology 10, 20, 30 Chemistry 10, 20, 30 Physics 10, 20, 30 Typing 10, 20, 30 Accounting 10, 20, 30 Physical Education 10

In the third year of the project an informal survey was conducted of Parallel Core Program students at the request of the school in order to see how students were using their in-school time. For a three-month period, randomly selected Teacher Advisor groups recorded their actual time spent on project courses during school hours. Despite the limitations of self-reported data and low response rates in certain cases, enough data were generated to give an indication of the degree of time-on-task variability.

During the last two years of the project, student completion patterns were recorded for the Department-based and School-wide models. Figures were kept for students in three categories, as follows:

1. Students who completed courses in less than one semester.
2. Students who took a full semester to complete courses.
3. Students who needed more than one semester to complete courses.

Data Analysis

For the academic evaluation component of annual activities, mean scores of project students were compared with the mean scores of control groups through the use of the t-test. Significant differences were identified at the .05 level. A primary evaluation goal was that student achievement in Project ABC be as good as or better than achievement levels locally and provincially. The absence of significant differences suggested that academic achievement was not affected by the educational model employed in the project. Scores which were significantly higher in project courses suggested that a positive impact was being experienced by students as a result of the project model. Scores which were significantly lower in project courses suggested that the model was having a deleterious effect on student achievement.

The comparisons varied from model to model but, generally, the following categories of mean scores were compared:

Model students' mean scores with Calgary Board of Education students' mean scores

Model students' mean scores with Province of Alberta students' mean scores

For analysis of the attitudinal component, questionnaires were analyzed with the SPSS program Cross-tabs to determine if significant differences in perceptions existed between the following respondent groups:

1. Project students and control group of students (where appropriate).
2. Project teachers and control group of teachers (where appropriate).
3. Project students and project teachers.
4. Project teachers and school administrators.
5. Project students, project teachers and school administrators.

Significant differences in perception were identified at the .05 level with the use of Chi-square to determine whether the variables were independent or related and Cramer's V to measure the strength of the relationship.

Both of these statistical activities were greatly supported by the assistance of the Program Evaluation Section, Calgary Board of Education.

Interview data were analyzed using traditional content analysis methods as outlined below:[4]

1. Development of Categories (a) responses unitized;
   (b) responses coded by group;
   (c) responses sorted by question number;

	(d) categories determined for each question; (e) responses sorted into categories.
2. Summary of Responses	(a) category descriptors developed; (b) similar responses compiled; (c) similar responses paraphrased; (d) unique responses edited; (e) summary of responses for each question prepared.

Summative Evaluation

The purpose of this Summative Evaluation Report is twofold: 1) to assess the success of project schools in providing students with acceptable alternatives to traditional time credit relationships in terms of student achievement, curriculum adherence, removal of time as a credit requirement and implementation of competency as the basis of awarding credit; and 2) to provide Alberta Education with information for use in the consideration of province-wide applications of alternatives to time credit. The methodology employed in this summative evaluation with regard to sampling procedures, control groups, design, data collection and data analysis is outlined below.

Sampling Procedures

For the final analysis of Project ABC, represented by this volume, an attempt was made to extract critical variables from the enormous wealth of data generated over five years. While formative data provided a useful communication function for project participants, summative data were extracted and analyzed to provide conclusions at the system and provincial levels.

The academic evaluation component of summative activities was limited to the mean scores of project students in 30-level courses as they best reflected project outcomes.

The attitudinal evaluation was limited to the responses of project students on the six critical variables most closely linked to project evaluation goals. Teacher and administrator data provided a useful context for analysis of student data but numbers were too small to warrant statistical analysis.

Control Groups

Control groups for the academic evaluation were limited to the system-wide and province-wide groups of students who provided mean scores for appropriate courses. Individual models' control groups were eliminated from the statistical analysis although they continued to provide a useful context.

No control groups were used for the attitudinal evaluation. Instead, attitudes and perceptions of students in each of the three models were compared.

Design

From the "macro" perspective of a summative stance, model differences diminished in the face of the question, "Do alternatives to time-credit work?" Therefore all project data were treated identically.

Academic evaluation activities related only to the results of 30-level courses. Attitudinal evaluation activities related to six critical variables extracted from the student questionnaire. The six variables divided into two key topics as follows:

1. Time Use Flexibility	(a)	use of a stop mechanism;
	(b)	provision of flexible entrance to the next level of a course;
	(c)	course learning pace compatible with student ability.
2. Demonstration of Competence	(a)	use of tests at the unit level;
	(b)	demonstration of competence at the unit level before proceeding;

(c) advancement to the next course based on student competency, not time spent.

A major contextual evaluation activity which occurred in 1987 was the design and implementation of a policy Delphi study which had a panel of 23 project teachers and administrators. Over a three-month period three rounds of questionnaires were designed, disseminated, collected and tabulated on the topic of project outcomes. The study was completed within five months with a 95% retention rate. Although the study is reported elsewhere,[5] the data which it provided have proved to be a rich source of contextual data of a summative nature and are referred to throughout this report where appropriate.

Instrumentation

No new instruments were developed for summative activities apart from those generated in the policy Delphi study referred to above.

Data Collection

No new statistical data were required for the project-wide evaluation activities reported here. However, contextual activities provided the opportunity to develop some summative inquiry methods. In the final years of participant interviews, a number of questions were formulated of a summative nature.

For example, project teachers were asked, "How has teaching in Project ABC influenced your teaching style?"

Curriculum consultants from Alberta Education were asked to comment on two summative questions regarding each course reviewed, in addition to the two formative ones. These summative questions were as follows:

1. Are the methodological approaches used in this course educationally sound?

2. Could this course (or program) be offered in a similar manner in another school in Alberta? What critical factors would have to be taken into account?

The policy Delphi provided valuable information on the following topics:

1. Essential components of an alternative to time-credit program.
2. Project benefits and drawbacks.
3. Project teacher characteristics.
4. Outstanding issues.

Data Analysis

A great deal of data in this study was available for quantitative analysis. In particular, two sets of data were treated including student, teacher and administrator perceptions on key study variables and student achievement data for project, city and province-wide mean scores. Procedures are outlined below.

PERCEPTUAL DATA

Descriptive statistics were prepared for student, teacher and administrator perceptions of key variables by extracting data from the attitudinal questionnaires administered from 1983 to 1987. Due to small sample size, no analysis of variance was conducted for teacher or administrator data. However, student perceptions were subjected to univariate analysis of variance with year as a factor to determine change over time within each school. Then differences between schools during the last year of the project were also examined.

The analysis was conducted using the Statistical Package for the Social Sciences (SPSS) procedure entitled ONEWAY, an analysis of variance procedure which includes *post hoc* testing. This procedure was selected rather than ANOVA which does not include a *post hoc* test.

The *post hoc* comparison was carried out using the Scheffé test (an example of a range test) for the purpose of comparing several variables. The search was for any significant differences between all possible group pairs of means. The Scheffé procedure was utilized because it is a common and conservative test to use when there are unequal group sizes as was the case in this study with three different sized student populations in the three Project schools.

If the F probability was $\leq .05$, it was considered a significant difference and thus the *post hoc* procedure was carried out to determine between which school or year the significant difference existed. It was necessary to return to the tables of means to determine the direction of change.

ACHIEVEMENT DATA

Descriptive statistics were prepared for 30-level courses completed by project students from 1983 to 1987. Similar data were compiled for all students in the Calgary Board of Education who had completed the same courses in the same years and similarly for all students in the Province of Alberta.

A univariate analysis of variance was conducted with year as a factor to determine change over time within each school. Then project student achievement levels were compared with those of the city and the province, within each year as appropriate.

The procedure employed was the new SPSS-X ONEWAY analysis of variance with the *post hoc* comparison conducted by using the Scheffé test. If the F probability was $\leq .05$, the *post hoc* procedure was conducted to further clarify if significant differences existed. The conservative nature of the Scheffé test was deemed appropriate because of the very large differences in group sizes.

The Delphi Study

As part of the final year of evaluative activities in Project ABC, a policy Delphi study was designed to capture some of the more informal information and perceptions which would not emerge from other more structured summative activities. The Delphi allowed participants from each of the three schools to probe complex issues anonymously over a period of time.

The policy Delphi method was chosen as the research technique for the following reasons:

1. Solicits information by open-ended questions.
2. Accommodates the busy schedules of teachers and provides time to contemplate answers.
3. Provides a mechanism for respondents to comment on one another's comments and suggestions.
4. Maintains anonymity.
5. Allows opinions and issues to be clarified in a cyclical process.

A panel of 21 teachers and administrators took part in the three rounds of the study. The retention rate of panelists was 95%. The study was completed in the first five months of 1987. The process proved to be effective in providing invaluable information of a contextual nature regarding Project ABC. Findings are reported in Chapter 5.

Problems

Inevitably in a project of this magnitude and length, certain problems are encountered. These are outlined on the following pages.

1. *Pilot Year*

Although the project officially began in September 1982, contractual concerns between Alberta Education and the Calgary Board of Education slowed the development process and the evaluation was not actually initiated until November or December of that year. Evaluation goals were not finalized until the Spring of 1983. The decision to consider that first year as a pilot study was a wise one as the ensuing instruments were much stronger, but a year of attitudinal data was essentially lost in the process.

2. *Two Levels of Goals*

As outlined in Chapter 1, the project evolved with provincial goals focusing on alternatives to the Carnegie Unit while individual schools were focusing on ways to meet the needs of students, particularly dysfunctional ones, through personalized instruction and continuous progress. The two levels of goals which thus developed were bound to generate a certain amount of conflict. The school-level goals were viewed by staff with more immediacy than the provincial level goals, while the provincial-level goals tended to influence the development of evaluation goals, negotiated at the Steering Committee. Thus on occasion, the evaluation was viewed as serving provincial needs rather than local ones. Over time, however, the conflict disappeared as both sets of goals became more attainable and as the contextual component of the evaluation developed to address each school's specific needs.

3. *Three Models*

Again, due to the method of project initiation, three disparate models were united in one project. Initial concerns and hostility about being "lumped together" declined as the formative evaluation process came to examine each model

separately and no attempts were made to compare results in the light of project goals. Further, the relations among the schools improved as it became evident that each had carved out a unique program. Eventually more sharing began to occur and when confronted with financial cutbacks, a perceived lack of support from their peers and an uncertain future, cordiality ensued.

4. *Turnover in the Steering Committee*

By the fifth year of the project only one original Steering Committee member remained, apart from the Project Director and the external evaluator. Turnover resulted from retirement and job changes at both Alberta Education and the Calgary Board of Education. All members who served on the committee demonstrated a high degree of commitment and interest during their tenure, but a certain longitudinal perspective tended to be lost and the project's roots were buried.

5. *Model-specific Problems*

A number of model-specific problems arose at various points in the project as might be expected in a lengthy project with a loosely-knit structure. The most serious problems included the following:

Department-based Model	Declining enrolments
Parallel Core Program Model	Lack of development of the continuous progress component
School-wide Model	Slow program development and lack of a game plan

Limitations

In addition, there was a number of limiting factors which emerged during the five-year period, as follows:

1. *Institution of Diploma Exams*

   One year after project initiation, Alberta Education implemented the Grade 12 Diploma Exams. This had a marked impact on Grade 12 project students, in some cases discouraging their participation. With the exams set only three times a year, continuous progress and, more specifically, continuous exit, was not realistic. Further, with the increased emphasis on final grades, some students were not willing to be part of an educational experiment. To a degree, Grade 12 became a holding tank situation. However, project teachers turned this to advantage by implementing review units which might not have been developed otherwise, and this may have had an impact on final grades achieved.

2. *Discontinuation of Grade 9 City-wide Exams*

   After one year of the project, the Calgary Board of Education Grade 9 city-wide exams were discontinued, affecting the basic design of the Parallel Core Program evaluation. It was no longer possible to make baseline comparisons between project and control students prior to high school program entrance.

3. *Diminishing Value of Model-specific Control Groups*

   As indicated above, the control group at Sir Winston Churchill lost much of its impact when critical questionnaire items were removed by the school administration. In addition, over time, some crossover tended to occur, and the control group came to

approximate the test group in some areas despite basic philosophical differences. Most noticeable at Churchill was the increasing use of unit-level tests.

In the Parallel Core Program, differences between project and control students' perceptions remained strong throughout the project, but it was interesting to note organizational changes which occurred in the control program because of the project's influence (e.g., increased use of the test centre by control students, implementation of the Teacher Advisor system school-wide).

In the School-wide Model, attempts to develop a "traditional" control group collapsed when the school's definition of PACE expanded to encompass all students in the school.

And finally, over the five-year period, attitudes toward evaluation began to change as more naturalistic, evolutionary models became accepted, the black box approach to measuring human behavior lost ground, and reliability and objectivity became tempered with auditability and confirmability.[7]

4. *Diminishing Value of Questionnaire in a Longitudinal Study*

While the stringent testing that took place at the end of the first year ensured that valid instruments were developed, and while repeated significant differences between project and control groups confirmed their validity, the instruments still reflected perceptions prevalent early in the study. It is to the credit of project teachers and administrators that the project evolved far beyond the items on the questionnaires, which while still valid, came to be somewhat superficial. Fortunately, the contextual component of the study was able to expand into project areas which could not be predicted in 1983.

5. *Changing Business Education Curriculum*

It seemed for the full five years of the project that the Business Education curriculum was in a state of change. This was a constant source of frustration for Business Education teachers who were trying to write and then maintain individualized materials. In fact, this situation is only representative of what lies ahead for all high school teachers with the recent implementation of the Secondary Education Policy Statement.

6. *Evaluator Bias*

Being the evaluator of a project for five years is like being a project participant. Faces and personalities became very familiar, the schools became comfortable places to be. Staff members who had been interviewed five years running might not be viewed impartially. On the other hand, with familiarity came a growth in understanding about project successes and frustrations and about model subtleties and complexities which might escape a cursory glance. The stringent statistical activities conducted at project end have hopefully helped to counter evaluator bias, unconscious or otherwise, while evaluator understanding has hopefully helped to strengthen study conclusions and recommendations.

CHAPTER 4 - STUDY FINDINGS FOR EACH MODEL

In this chapter each model will be reviewed in the following manner. First, a description of the school at the beginning of the project will be provided along with original school-based goals. Next, a description of the school at project end will be outlined. Finally, model-specific study findings related to summative evaluation goals will be presented. In particular, the success of each of the three project models will be assessed with regard to their ability to provide students with acceptable alternatives to traditional time-credit relationships in terms of student achievement, curriculum adherence, removal of time as a credit requirement and the implementation of competency as the basis for awarding credit. Overall project findings and considerations for Alberta Education are reserved for the next chapter.

Department-based Model

Before the Project

In 1974, William Aberhart High School requested that the Calgary Board of Education renovate the Business Education wing of the school. At that time, it consisted of a long hall with doors leading off into classrooms. As the proposal noted:

> The students can be compared to animals entering various chutes into their pens. They complete their activity in a particular pen then go down the long hall through another chute into another pen to do another activity.[1]

In contrast, modern business offices were wide open, brightly lit places where many activities occurred simultaneously. The propo-

sal called for increased flexibility and efficiency in programming, and staff and equipment utilization through the development of an open area simulated office setting. The walls between five classrooms and the hallway were to be removed, carpet to be installed and modern desks to replace the old typing tables. The open area would permit a reduction in the number of typewriters required, more flexible timetabling of courses, team teaching, individualized instruction and continuous progress, although credits would have to be awarded at the end of the semester.

With renovations and the new program approach in place, student enrolment in Business Education tended to exceed normal Business Education enrolment for a school of that size (915 students and 53 teaching staff). At that time, 700 of the school's students took some element of the Business Education program.[2] This was the result of the flexibility afforded by the open area. Nearly all Business Education courses were provided on an individual basis every period thus accommodating most students' timetable requirements. In addition, students were encouraged, albeit unofficially, to progress as quickly as possible. Teacher satisfaction was high despite the workload because they were able to meet each student's problem as it occurred. They enjoyed working together as a team and liked the variety of teaching a number of courses simultaneously.

In 1981, the Business Education Department saw Project ABC as an opportunity to provide teachers with support to enable them to translate all their program offerings into unit packs. It would allow students to progress at a speed compatible with their ability by offering them credits upon mastery. A number of other program benefits was foreseen by participation in the project, including the following: handling record keeping and tracking problems through the use of a clerical aide; acquiring an additional photocopier and a microcomputer to assist in materials preparation; providing release time for curriculum revision; and encouraging staff development through workshops and visits to

other schools. It was hoped that the program would have a light-house effect in the school by encouraging other departments to investigate continuous progress. To that end the school requested some support funds specifically for developmental purposes by two departments a year. It was anticipated that the program would be self-sustaining after three years of support funding. Administrators were confident that Alberta Education requirements would be met. They welcomed student testing and program evaluation to prove program success.

At the Project's End

In 1987, the open area of the Business Education Department at William Aberhart looked much as it did at the start of Project ABC with the addition of several computer terminals and a small locked enclosure to house the mini-frame computer, acquired by the department in 1985 under separate funding. However, although the open area could accommodate 106 students at any one time, it was seldom full as the department had suffered declining enrolments since 1984. Although the school population held steady around 915 students, a variety of factors worked against Business Education, including the following:

1. Implementation of Provincial Grade 12 Diploma Examinations causing students to focus on core curriculum areas.
2. The Alberta Secondary Review recommended increased required credits leaving less opportunity for options.
3. Growth of the school's Bilingual Program restricting a larger proportion of the students to fewer options.

The decline in enrolment had a noticeable impact on the open area as teacher coverage was also forced to decline. Instead of two or three teachers covering the area simultaneously, in 1987 one or two teachers covered it and the possibility of closing the area completely for a period every day was becoming very real. Teachers were becoming less accessible to students as they were scheduled to teach some closed classroom courses, including a few in non-Business Education subjects elsewhere in the school.

Project ABC funding had lasted for three years as anticipated, but once it ran out the school encountered some difficulty in locating funds to support the clerical aide who had become essential to the program. Some temporary relief was found but the future of that position became precarious.

Teachers had received release time, particularly in the first year of the project, for curriculum revision and the preparation of unit packs but they were faced with a continually changing Business Education curriculum at the provincial level. By 1987, materials were out of date and teachers found little time to revise them with no support in this area.

The Business Education program had acted as a lighthouse in that one other department in the school attempted to develop a similar model. From 1984 to 1986 the English Department became part of Project ABC at the request of its staff members, but no additional funds were allotted for its development. As planned, the Business Education budget was used to cover some costs. Ultimately, the program failed and the English teachers returned to their closed classrooms. Problem areas included the following:

1. Lack of seed money
2. Lack of adequate planning
3. Teacher-administrator communications
4. Parental communication
5. Organizational problems
6. Student achievement

The experiment had some positive outcomes, however, as the English teachers made the following gains:

1. Professional development
2. Varied teaching methods
3. Wider use of materials
4. Strengthened curriculum

No other department took up the challenge.

Despite problems encountered by the Business Education Program, it remained at project end viable, mature, smoothly operating and successful, even if threatened with extinction due to low enrolments.

Study Findings: Department-based Model

Briefly, to review, the primary goal established for this evaluation study was as follows:

> **To assess the success of the project schools in providing students with acceptable alternatives to the time credit relationships expressed in the current Junior and Senior High School handbook where:**
>
> **(a) The student achievement level is as good as or better than the achievement level in both local and provincial programs.**
>
> **(b) The Alberta Curriculum is adhered to.**
>
> **(c) Time has been removed as a requirement in awarding credit.**
>
> **(d) Competency has been made the basis for awarding credit.**

This section provides a summary of findings that relate specifically to the Department-based Model at William Aberhart High School.

(a) STUDENT ACHIEVEMENT

In order to identify changes in achievement over time, Project students' final grades were analyzed in Typing 30, Accounting 30 and Law 30 from 1984 to 1987, using analysis of variance procedures. In Accounting 30, there was a significant decline in achievement levels from 1984 to 1986. A summary of students' achievement levels for the Department-based Model is provided in Table 6. (Consult Appendix 1 for detailed analysis.)

TABLE 6

STUDENT ACHIEVEMENT MEAN SCORES

DEPARTMENT-BASED MODEL

PROJECT ABC

1984-1987

COURSE	1984 Mean	1985 Mean	1986 Mean	1987 Mean
TYPING 30	63.2	56.7	62.8	-*
ACCOUNTING 30	72.4	59.0	46.7	61.4
LAW 30	60.0	73.5	65.3	70.2

* Student sample less than 5; therefore, analysis is not valid.

With regard to achievement level comparisons between project students and their peers within the system and within the province, project students' grades were compared with those of the control groups using analysis of variance procedures.

Project students' grades in Typing 30 tended to be lower than those of control groups from 1984 to 1986 and were significantly lower in 1985. In 1987, the number of students involved was too small to analyze. In Accounting 30, students' scores tended to be lower than those of control groups from 1985 to 1987 and were significantly lower in 1986. Law 30 mean scores tended to be higher than the mean scores of the control groups from 1985 to 1987 and were significantly higher in 1985. A summary of significant differences in project students' mean scores is provided in Table 7. (Consult Appendix 1 for detailed analysis.)

(b) CURRICULUM ADHERENCE

Alberta Education consultants were asked to validate the curriculum of project courses by determining the following two facts:

1. If the content for each course matched the Program of Studies for Senior High Schools.

2. If the standards applied in each course were comparable to those applied generally across the province.

For each of the five years of the project, an Alberta Education consultant specializing in Business Education visited the program, spoke with staff members and reviewed instructional materials. (Consult p. 44 for a list of courses reviewed.) The report prepared by the consultant was published annually in the Formative Evaluation Report.

TABLE 7

SUMMARY OF SIGNIFICANT DIFFERENCES BETWEEN DEPARTMENT-BASED MODEL MEAN SCORES AND CONTROL GROUPS PROJECT ABC

1984-1987

COURSE	YEAR	MODEL MEAN	CBE MEAN	ALBERTA MEAN	STATISTICAL COMPARISON
TYPING 30	1985	56.7	66.0	66.9	Significantly Lower*
LAW 30	1985	73.5	62.6	62.2	Significantly Higher*
ACCOUNTING 30	1986	46.7	68.7	70.0	Significantly Lower*

* Due to the small sample size in the project model compared to the system and province populations, the analysis of variance may be distorted.

The content of the Business Education courses was found to match the Program of Studies for the Senior High School in all but one case. In 1987, it was found that the Law 30 course made provision for students to select eight out of a possible 11 modules of study, thereby allowing them to opt out of certain sections of the material. All other courses throughout the project matched the prescribed curriculum.

The standards for Business Education courses were also reviewed annually and, in all cases, were found to be comparable to standards applied generally across the province.

To conclude, the curricula in Business Education courses offered to students at William Aberhart High School from 1982-1987 did not vary significantly from provincial curriculum requirements in terms of either content or standards. No significant changes resulted in the Business Education curriculum when it was offered as an individualized program on a continuous progress basis.

(c) TIME REMOVED AS A CREDIT REQUIREMENT

Beginning in 1982, a student questionnaire with a Likert-type scale was administered each semester to measure project students' attitudes and perceptions. Similar questionnaires were administered annually to project teachers and administrators. Three items dealt specifically with the removal of time as a requirement in the granting of credit. The variables and items were as follows:

VARIABLE	QUESTIONNAIRE ITEM
1. Stop Mechanism	(Students) I can concentrate on a particular problem I am having until it is solved.

VARIABLE	QUESTIONNAIRE ITEM
1. Stop Mechanism (continued)	(Teachers) Students can interrupt their progress to concentrate on a particular problem they are encountering until it is solved. (Administrators) Project ABC students can interrupt their progress to concentrate on a particular problem they are encountering until it is solved.
2. Learning Rate Compatible with Ability	(Students) I can spend as long as I need to complete course requirements. (Teachers) Students can take as much time as they need to complete course requirements based on their learning needs. (Administrators) Project ABC students can take as much time as they need to complete course requirements based on their learning needs.
3. Flexible Entrance to Next Course Level	(Students) I can begin the next course in this subject whenever I am ready to do so. (Teachers) Students may enter the next course in this subject whenever they are ready to do so. (Administrators) Project ABC students may enter the next course in a subject whenever they are ready to do so.

In the formative evaluation, the CROSS-TABS program of SPSS was employed annually to identify significant differences in perception between project students and their local control group, and among students, teachers and administrators. Items which elicited significantly different perceptions then pro· ied the basis for interview questions for a 10% sample of students in the second semester. The results of these

interviews then provided the basis for further questions on the topics which were posed to teachers and administrators. In this way, it was possible to clarify questionnaire results and probe for additional information.

In the summative analysis, the three variables identified above were subjected to a univariate analysis of variance of student responses with year as a factor to determine change over time. The program employed was the SPSS Program ONEWAY with *post hoc* testing. This process helped to identify major changes in perception over time. Consult Appendix 1 for statistical findings related to the Department-based Model.

Analysis of both statistical and interview data collected over the four-year period indicates that the Department-based Model was successful in providing students with a stop mechanism in their studies when encountering difficulty and allowed them flexibility in terms of when they could advance to the next course level. Perceptions were divided, however, as to whether students were provided with the chance to vary their learning rate based on their ability.

While teachers and administrators were positive in their questionnaire responses throughout the project that variable learning rates applied, students maintained that varied rates occurred only seldom or sometimes. However, over time, students' comments in their interviews became more positive about varied learning rates. In 1984, 64% (n=14) said that they could not spend as long as they needed, to complete course requirements. By 1987, over 75% (n=8) said that they could take as long as they needed, demonstrating that variable learning rates were perceived to be more in evidence by project end than they were initially.

Figures gathered in 1987 indicated that out of 224 Business Education students taking courses in the open area during

that school year, 27.2% completed their courses early, 57.6% took the full semester and 15.2% were granted extensions, thus indicating that flexibility with regard to learning rate was in effect. However, in their interviews, teachers reported consistently that only students perceived to be good workers, good attenders, or slow learners were allowed to continue in a course for more than one semester. This policy was not well communicated to students as they remained somewhat uncertain about course extensions at the end of the project.

To conclude, time was removed as a requirement in awarding credit in the Department-based Model. Students had flexible use of time within the unit, opportunity for time extensions with teacher permission, opportunity to stop and solve a problem as it was encountered, and opportunity to commence the next level of a course as soon as they were ready. Students requiring more time than the norm were treated on an individual case basis.

(d) COMPETENCY THE BASIS FOR AWARDING CREDIT

Variables and items on the questionnaires relevant to the topic of competency were as follows.

VARIABLE	QUESTIONNAIRE ITEM
1. Test Use at the Unit Level	(Students) I write a test or do a special assignment at the end of each unit in this course. (Teachers) Students are tested for achievement by unit tests or special assignments at the end of each unit in my courses. (Administrators) Project ABC students are tested for achievement at the end of each unit.

VARIABLE	QUESTIONNAIRE ITEM
2. Demonstrated Competency at the Unit Level before Proceeding	(Students) I must earn a certain mark in this unit test or special assignment before proceeding to the next unit. (Teachers) Students must demonstrate a specific level of competence for each unit of a course before proceeding to the next unit. (Administrators) Project ABC students must demonstrate a specific level of competence for each unit of a course before proceeding to the next unit.
3. Advancement Based on Competency, Not Time	(Students) I can exit from this course whenever I have completed the requirements. (Teachers) Students may exit from courses whenever they have completed the requirements. (Administrators) Project ABC students may exit from courses whenever they have completed course requirements.

The data were treated in a similar way to that for Time Removed as a Credit Requirement, outlined above, for both formative and summative evaluations. Consult Appendix 1 for statistical findings.

Analysis of both statistical and interview data collected over the four-year period indicates that the Department-based Model was successful in testing students at the unit level and in ensuring that students demonstrated competency in their course material before progressing to the next course level. Opinions were divided, however, regarding whether or not students had to demonstrate competency at the unit level before progressing to the next unit.

While teachers and administrators were positive in their questionnaire responses throughout the project regarding competency at the unit level, students' responses indicated that they felt this to be the case only sometimes. In 1984, 79% of students (n=14) said in their interviews that they did not have to get a certain mark on a unit test before proceeding to the next unit. The following year, 40% (n=10) said that they did have to earn a certain mark before proceeding and responses did not change significantly in subsequent years. Also in 1985, half of the teachers interviewed (n=6) indicated students had to obtain a passing grade before proceeding to the next unit and, again, responses did not change significantly over time.

It appeared that there was a relationship between whether the nature of the course and whether competency was required for each unit. Courses which were content-based, such as Accounting, tended to have competency requirements while courses which were mainly non-sequential, such as Law, tended to allow students to redo unsuccessfully completed units at the end of the course.

To conclude, competency was the basis for awarding credit in the Department-based Model in that tests were used at the unit level and advancement to the next course was based on competency demonstrated and not time spent; however, competency requirements at the unit level remained variable and appeared to depend on the nature of material in any specific course. There did not appear to be a department-wide policy on this topic.

To summarize study findings specific to the Department-based Model as it developed in the Business Education Program at William Aberhart High School, Project ABC formalized a move which had been afoot for a number of years. Teachers had recognized the appropriateness for an individualized, continuous progress model in a

simulated office setting. Facilities had already been renovated to this end and the timetable flexibility which had resulted had attracted students to the program.

Project ABC enabled teachers to prepare individualized materials, to allow students to progress at their own rate, to gain needed support in the areas of computer and clerical assistance and to benefit from staff development.

However, by the end of the project, enrolments in Business Education courses had declined significantly due to the implementation of both provincial Departmental Exams and the recommendations of the Secondary Review, both placing greater demands for credits in core subject areas and leaving students with fewer opportunities to take option courses. In addition, the school's bilingual program had grown, further restricting the access of the student population to options. With the growth in the need for computer and word processing courses, some of the population decline might have been offset with more aggressive program marketing. The drop in student enrolments also affected the open area by decreasing teacher availability significantly as fewer teachers were assigned to the Business Education Department. As well with the termination of project funds, the clerical support position was cancelled, creating further non-instructional demands on teachers' time and cutting further teacher's individual time with students.

Despite the setbacks, the study findings were generally encouraging with regard to project goal attainment. Overall, students' achievement was comparable to that of non-project students within the Calgary Board of Education and the Province of Alberta as few significant differences were identified, although final grades in Typing 30 and Accounting 30 tended to be somewhat lower. The curriculum offered in the individualized format did not vary significantly from provincial requirements in terms of either content or standards. Time was removed as a requirement in awarding credit as students had flexible use of time within the unit,

opportunity for extensions with teacher permission, opportunity to stop and solve a problem as it was encountered and opportunity to begin the next level of a course as soon as they were ready. Individual students with extension needs were treated on a case by case basis. Competency was made the basis for awarding credit in general terms. Tests were used at the unit level and advancement to the next course was based on competency demonstrated rather than time spent in the course; however, competency at the unit level remained variable mainly due to the non-sequential nature of units in many Business Education courses. It appeared that no departmental policy had been developed regarding competency at the unit level.

William Aberhart High School had demonstrated by the end of Project ABC that an individualized, continuous progress program could function smoothly in an option area and that project concepts were particularly appropriate in Business Education because it fostered a real business environment. Events beyond the control of the program had reduced enrolments significantly, however, and the future of the program was uncertain.

Parallel Core Program Model

Before the Project

John G. Diefenbaker High School opened in 1970 with a unique physical plant.[3] It had a number of large open area instructional spaces, as well as flexible classrooms, regular classrooms and seminar rooms. The library was placed adjacent to the Humanities area to encourage the integration of research into the program. All science labs were located in one area and could accommodate three to four classes at a time. The Math Department had an open instructional area in addition to several classrooms. Non-core subjects were taught in traditional classroom space. The school was unsemestered in Grades 10 and 11 and semestered for Math and the Sciences in Grade 12.

The school's curricula included a number of unique features. The Humanities program was a team-taught integration of Social Studies and English and had been in place for ten years. It had made a great deal of use of alternative methods of instruction. An individualized, self-paced Math program for selected students had been in place for four years and included a computerized test bank entitled Q-Math. Locally developed Science options were taught in the school, involving many elements of individual choice. The Biology and Chemistry courses also incorporated individualized activities into their programs.

Another feature was the use of personalized report letters. Staff members were used to reporting for self-pacing and continuous progress. Further, many Grade 12 students were accountable for their own attendance and independence was fostered. Finally, a test centre had been operating for three years, staffed by parent volunteers, to accommodate the many self-paced components of the school's curriculum.

In 1981, Diefenbaker had an enrolment of 1105 students (including 319 students in Grade 9) and a teaching staff of 59. The proposal for involvement in Project ABC of PEP (Personalized Education Program) focussed on the concept of developing "a school within a school"[4] for students identified as being independent, persistent, motivated and responsible. These students were seen as ideal candidates to learn a prescribed curriculum through flexible time use and increased choice. The program would begin in 1982 with 90 - 100 Grade 10 students in the alternative program and would expand in each of the next two years to Grades 11 and 12. It was estimated that by 1984 over half of the high school would be enrolled in this program. Eligibility would be determined by a variety of learning styles tests and parental permission. The program was not to be identified as elitist in any way but would be for both academic and non-academic students who learned independently.

Other program characteristics would include:

1. A combination of flextime and demand time for each of the core curriculum areas (Humanities, Mathematics and Science).

2. Regular classroom instruction for options.

3. Program teachers on a full-time flexible assignment.

4. Each student to be assigned to a Teacher Advisor who would monitor progress on a regular basis.[5]

5. Physical Education already modularized would be available at times of choice.

In 1983, as the program expanded to Grade 11, more teachers would be involved and students would experience more flextime as they had fewer options. By 1984 with the full program in place, Grade 12 students would be on total flextime for core courses and continuous progress would accelerate.[6] It was never the intention of the program that a main objective be early completion[7] but as the proposal stated, differing dates of completion would expand as the program enlarged.[8] Curricular objectives and tests would be the same for both the alternative and the regular programs. The assumption was made that students would achieve at a higher rate if learning styles were taken into account and if selection procedures were accurate.[9] In fact, teachers and administrators went on record to state that they believed the following:

- Students mature and gain self-confidence in their approach to learning when they take responsibility for that learning.

- Students take education seriously when they play an active part in its design; it gives them ownership.

- Students accomplish more learning when they are comfortable with a learning style that meets their unique needs.

- Student learning can be enriched by peer interaction and more individualized student-teacher interaction.

- Students are better able to define their personal capabilities and limitations if they can make choices of how, with whom, how much time, when and where they will learn specified curriculum.[10]

The administration at Diefenbaker saw Project ABC as a chance to provide an alternative program for independent learners. Funds were requested for in-service training, computer upgrading, release time for curriculum preparation, an additional teacher for the first year, a lab technician and a Math technician-clerical aide starting in the second year to assist with testing and record keeping. Beyond the third year, it was felt that regular funds would suffice apart from the maintenance of the two paraprofessionals. It was recommended that administration have more involvement in staff selection than had been the case to ensure teacher interest in and commitment to the program. Again, provincial testing and program evaluation were welcomed.

At the Project's End

In 1987, PEP enrolment reached 350 or 34% of Diefenbaker's 1030 students (now excluding Grade 9) and the teaching staff totalled 53, 12 of whom taught exclusively or nearly exclusively in PEP. In addition, PEP had two full time aides, the lab technician and the math aide. All core subjects were provided to PEP students in each of the three grade levels in an alternative learning mode. There was, however, no evidence of Physical Education being available at times of choice.

The use of learning packages was incorporated into the program along with large and small group activities and independent projects. Learning styles were addressed by initial selection and by providing students with alternative assignments and approaches. Students planned their weekly schedule in advance, submitting it to their Teacher Advisor for approval, arranging all their core subject time into flextime or demand time depending on their learning needs that week and on possible demand classes to attend. Typically, teachers ran a demand class three or four times during a week and students signed up for the one of their choice. Within the span of a unit, students could determine when to write their

unit test and did so at the test centre. All tests used in PEP were the same as those in the regular program and standards were comparable although, as time went by, it appeared that teacher expectations for PEP students increased.

On any one school day, PEP students could be observed scattered through the three open areas as well as through classrooms, conference rooms and the library in a variety of configurations: independent study, peer work groups, small group projects, demand classes of varying lengths and large group activities. Enrichment was stressed in the program as students were encouraged to stretch their capabilities. The Teacher Advisor system had expanded throughout the school and the Test Centre was being increasingly utilized by the regular program as well as by PEP. The PEP students tended to be confident, assertive and organized and seemed drawn to leadership positions in the school. Consistently throughout the study, PEP students expressed significantly greater satisfaction than regular students with affective components of the program such as satisfaction with program organization and challenge, teacher interest in students and communication both between students and teachers and between students and their peers.[11] While the program continued to address the needs of all independent learners, there was growth in the emphasis on challenge activities, thinking skills and creative problem solving. Staff commitment was high throughout the project and monthly or bimonthly PEP meetings off campus continued to play an important role in both democratic decision making and professional development.

While the program was considered highly successful by participants, parents and administrators, in terms of Project ABC its success remained qualified, due to the movement of the program away from the concept of continuous progress. The staff came to believe that the established affective goals at the school were incompatible with a continuous progress model in which students are encouraged to work at individual rates. A primary objective

of the school was to stress the communications skills: speaking, writing, reading, listening, viewing, debate and information retrieval. Another objective was to develop a process or lab-centred approach to Science. The degree of pupil-teacher interaction and peer interaction required to successfully meet those objectives was seen to be incompatible with a continuous progress model.

Study Findings: Parallel Core Program Model

This section provides a summary of study findings related to the primary goal established for this evaluation, as outlined previously, and refers specifically to student achievement, curriculum adherence, time removed as a credit requirement and competency becoming the basis for awarding credit.

(a) STUDENT ACHIEVEMENT

In order to identify changes in achievement over time, project students' final grades were analyzed in a number of 30-level courses from 1985 to 1987 using analysis of variance procedures. In all cases, the blended grades were used (i.e., combined Grade 12 Diploma Examination grade and teacher-assigned grade.)

Overall, students' achievement levels fluctuated very little. Mean scores tended to increase over time in English 30 and tended to decrease in Math 33. The only significant change was in Chemistry 30 where students' mean scores rose significantly from 1986 to 1987. A summary of students' achievement levels for the Parallel Core Program Model is provided in Table 8. (Consult Appendix 2 for detailed analysis.)

TABLE 8

STUDENT ACHIEVEMENT MEAN SCORES

PARALLEL CORE PROGRAM MODEL

PROJECT ABC

1985-1987

COURSE	1985 Mean	1986 Mean	1987 Mean
ENGLISH 30	65.7	66.2	68.3
ENGLISH 33	63.2	64.1	64.0
SOCIAL STUDIES 30	66.7	70.3	67.4
MATH 30	66.3	65.9	70.8
MATH 33	66.1	59.7	58.0
BIOLOGY 30	66.6	68.0	66.3
CHEMISTRY 30	70.8	63.7	74.1
PHYSICS 30	70.5	71.2	69.0

With regard to achievement level comparisons between project students and their peers within the system and within the province, project students' grades were compared with those of the control group using analysis of variance procedures.

Generally, project students' grades tended to be higher than those of their peers both in the system and in the province from 1985 to 1987, although only one course in one year was significantly higher. Achievement levels in Chemistry 30 were significantly higher than those of control groups in 1987. (Consult Table 9 for a summary of findings and Appendix 2 for a detailed analysis.)

(b) CURRICULUM ADHERENCE

Alberta Education consultants were asked to validate the curriculum of project courses by determining the following two facts:

1. If the content of each course matched the Program of Studies for Senior High Schools.
2. If the standards applied in each course were comparable to those applied generally across the province.

For each of the five years of the project, Alberta Education consultants specializing in each of the four core areas of English, Social Studies, Mathematics and Science were asked to visit the program, speak with staff members and review instructional materials. (Consult p. 44 for a list of courses reviewed.) The reports prepared by consultants were published annually in the Formative Evaluation Report.

The content of all courses offered in PEP was found to match the Program of Studies for Senior High Schools and, in fact, the Science and Humanities programs were found to exceed the Program of Studies requirements in 1986.

TABLE 9

SUMMARY OF SIGNIFICANT DIFFERENCES BETWEEN PARALLEL CORE PROGRAM MEAN SCORES AND CONTROL GROUPS PROJECT ABC

1985-1987

COURSE	YEAR	MODEL MEAN	CBE MEAN	ALBERTA MEAN	STATISTICAL COMPARISON
CHEMISTRY 30	1987	74.1	68.4	68.0	Significantly Higher

The standards of all courses in the program were found to be comparable to those applied generally across the province for all five years of the project.

To conclude, the curriculum offered to PEP students at John G. Diefenbaker High School from 1982 met or exceeded provincial curricular requirements in terms of content and met provincial standards in all cases. The consultants consistently submitted very positive reports about the PEP curricula and commended teachers for their commitment to the program.

(c) TIME REMOVED AS A CREDIT REQUIREMENT

Data regarding student, teacher and administrator perceptions about the removal of time as a requirement in the granting of credit were treated in the same way as for the Department-based Model. Consult Appendix 2 for statistical findings.

Analysis of both statistical and interview data collected over the four-year period indicates that the Parallel Core Program Model was successful in providing students with a stop mechanism in their studies when they were encountering difficulty. Flexible entrance to the next course level was not available to students because the program did not provide for continuous progress. Learning rate variability was addressed in a way which was unique to this program and is outlined below.

Students, teachers and administrators agreed that students could not take as much time as they needed to complete course requirements. The program was designed in such a way that all students began each unit together so time was limited to the traditional dictates of the curriculum in overall terms. However, a closer look revealed that time use appeared to be variable within the parameters of any particular unit. In

1985, data were collected regarding students' time on task within the unit. The evidence was conclusive that students' time was variable within the unit and was to a large extent determined by students' own perceptions of their learning needs. Thus, it was unlikely that any student would spend exactly 125 hours on a particular course over the span of a school year. In this way the Carnegie Unit was broken.

However, the parameters of variability were limited by potentially conflicting demands from a student's other core and option courses. With a set number of flexible hours in a school week, a student could only apportion part of that time to the needs of any particular course. Program administrators indicated in their interviews that the limitations were negligible due to both initial student selection procedures and a three-tiered policy developed to handle learning rate variability. This policy was as follows:

1. **Remedial Loop** - A student could continue for up to two units' worth of work without demonstrating competence so long as he was involved concurrently in remedial activities to bring him up to a satisfactory level of competency within that period.

2. **Stream change** - After being unable to catch up or demonstrate success during that two unit period, the student was transferred to a less difficult course (e.g., from Math 10 to Math 13).

3. **Program change** - If course change alone did not help to solve the student's difficulties in demonstrating competence, he was counselled out of PEP to the more structured regular program.[12]

In this manner, students encountering difficulty in the program could be counselled out of it. Coupled with program entrance criteria as well as a certain amount of self-selection which likely occurred once the program became well known, this policy helped to ensure student success in the program and decreased the need for variable learning rates.

To conclude, the Parallel Core Program Model removed time as a requirement in awarding credit to the extent that students were provided with an opportunity to stop and solve a problem as it was encountered and to vary time use within the unit according to their learning needs. However, students were not able to begin the next level of a course early or obtain an extension beyond the end of the semester or year because the concept of continuous progress was not adopted in this model.

(d) COMPETENCY THE BASIS FOR AWARDING CREDIT

Data regarding student perceptions about competency becoming the basis for awarding credit were treated in the same way as for the Department-based Model. Consult Appendix 2 for statistical findings.

Analysis of both statistical and interview data collected over the four-year period indicates that the Parallel Core Program Model was successful in testing students at the unit level. Individual advancement based on competency demonstrated at both the unit and course levels was not perceived to be available by either students or teachers although administrators tended to disagree about demonstrated competence at the unit level.

While continuous progress remained a suggested option in the school's program literature,[13] teachers and administrators replaced opportunities for continuous progress with enrichment and challenge. Therefore, they did not encourage early completion and provided the three-tiered policy to address the needs of students encountering difficulty. In their interviews, students remained uncertain about whether or not they could progress at individual rates and teachers tended not to discuss this option with students.

Competency issues were dealt with in a variety of ways other than individual continuous progress. In the first place, the great flexibility afforded students at the unit level provided many opportunities for one-on-one interaction between students and teachers. Secondly, competency was supported by initial student selection procedures, whether through required entrance criteria or, in cases where requirements were waived due to high motivation levels, through self-selection. Thirdly, curricular materials addressed a variety of learning styles, which coupled with frequent testing and feedback, promoted student success. In fact, failure levels remained low throughout the project indicating that while individual advancement was regulated, individual competency was thoroughly addressed.

To conclude, competency was the basis for awarding credit in the Parallel Core Program Model, but individual advancement in either unit or course was not possible.

The requirement that students ***demonstrate competency before proceeding to the next unit*** remained at unsatisfactory levels throughout the project and, in fact, declined over time although no significant changes occurred.

In 1984, competency was not the criterion for advancement to the next unit as students proceeded from unit to unit together. The three-tiered policy referred to above crystallized in 1985 to handle students' lack of demonstrated competence at the unit level; however, by 1986 the remedial loop component of this policy had become a minor consideration which may have been due to the student selection process occurring simultaneously (also referred to above). In other words, students requiring extensive remediation may no longer have been in the program. Both students' and teachers' perceptions of the use of ***demonstrated competency before proceeding to the next unit*** had declined from initial levels by 1987.

The criterion of *advancement based on competency* declined significantly during the course of the project. The variable was very significant with an $F(3, 495) = 26.71$, $p = <.001$. The Scheffe procedure indicated significant differences between 1984 and 1985, 1984 and 1986, and 1984 and 1987. There was a significant decrease in the mean in every other year compared to 1984. This pattern is similar to that found for the criteria related to time removal as a credit requirement, namely *learning rate compatibility with ability* and *flexible entrance to the next course level*. The similarity of findings regarding these closely linked concepts provides support for the validity of statistical approaches employed.

To summarize study findings specific to the Parallel Core Program Model as it developed in PEP at John G. Diefenbaker High School, Project ABC allowed the school to pursue its goals of student independence and responsibility through the development of an alternative learning model for selected students. The school's physical plant and a variety of unique features in the curriculum fostered alternative instructional methods and teachers had already experimented with individualization and self-pacing.

By the end of the project, PEP had emerged as a strong and clear alternative to the regular program providing a core program for students in Grades 10 through 12 who were identified as independent learners. The program endorsed student choice in terms of time use within the unit and was supported by a Teacher-Advisor system and a Test Centre. Student satisfaction was consistently and significantly higher than that of students in the regular program. Achievement of project students tended to be comparable or somewhat higher than achievement levels in the system and the province and one course, Chemistry 30, was significantly higher than control groups in the final year of the project.

The curricula offered in PEP met or exceeded provincial requirements in terms of content and standards were comparable with those

employed across the province. Consultants from Alberta Education were consistently positive in their comments about the curricula developed in the project for PEP.

As PEP developed, however, it became apparent that the program had charted a somewhat different course for itself than the one initially proposed. By project end PEP was clearly an alternative program which espoused the concept of variable time use within the unit but not within the school year. It had minimized the need for competency-based advancement by the selection of appropriate students who could succeed within the time limits provided, by the provision of materials for a variety of learning styles and by allowing for extensive one-on-one interaction between students and teachers. Further, program growth was evident in the area of student challenge as the curriculum began to move beyond prescribed materials into enrichment areas. It did not, however, provide a continuous progress alternative for students, for while breaking the traditional Carnegie Unit, it did not allow individual students to progress at their own rate. PEP had become an excellent program for independent learners but in clarifying its own goals, had eliminated continuous progress.

School-wide Model

Before the Project

In 1981, Ernest Manning High School was a traditional comprehensive, fully-semestered high school with 745 students and 41.5 teaching staff. The school had recently developed a philosophy which was student-centered in intent. The school administration and staff were looking for an innovative project to help foster the following two goals:

1. That students could develop a positive self-image.
2. That students would develop a continuing interest in learning and pride in accomplishments.[14]

They felt that the Carnegie Unit restricted their student-centered focus by discouraging both high and low ability students and by stressing only the cognitive area. Their Business Education Department had already developed a form of continuous progress through the use of individualized and small group instruction, learning units and timetable flexibility.

The school's ultimate goal, as identified by their proposal was to make the school "sensitive to and capable of recognizing a number of different delivery systems for different perceived needs of students."[15] Each department was to develop programs to meet "one or more"[16] of the following outcomes:

1. Selection of appropriate learning styles.
2. Student movement through courses at their own rate.
3. Flexibility in course scheduling to increase availability to students.
4. Better programs of remediation and enrichment.

It was felt that, "while moving in a broken front,"[17] this goal could be reached in three to five years. Three stages of development would occur. In the first, due to the varying states of readiness exhibited by staff members, extensive staff development would be required, including workshops and visits to other similar programs in North America. Curriculum development would occur in Business Education, Mathematics and, to a limited extent, in Social Studies. In the second stage, all departments would prepare the program they intended to implement and school policies would be modified. In the third stage, the departments would implement their programs, evaluate their results, and make appropriate changes. The proposal was unable to predict what possible directions the program might take in order to personalize education,[18] but it was expected that learning styles would be accommodated in such a way that the following would occur:

1. Some students would be in traditional classrooms.
2. Some students would be highly independent moving at their own rates.
3. Some students would be in a combination of the above.

Eventually all students would be affected in the move toward continuous and individual progress. It was anticipated that teacher relief time would be required as would clerical help and computer upgrading to support material production and student tracking. Administrators were confident that the Program of Studies for Senior High Schools would be adhered to and they welcomed testing and evaluation.

At the Project's End

In 1987, enrolment at Manning reached 780 students due to the closure of a high school nearby and had a teaching staff of 43.5. Project ABC, or PACE (Personalized and Continuous Education), had grown to encompass the whole school, but it was the first year that Grade 12 was functioning as part of the project. Development tended to be slower than anticipated due to the size of the task at hand, the time needed to realign staff philosophy and the lack of either clear school-wide or procedural goals during the early years.

However, despite delays, a vision statement for the program was hammered out in 1986, as follows:

> The PACE Program at Ernest Manning High School reflects the school's philosophy which endeavours to ensure individual student development through effective education. The program provides an environment which focusses on the learner in order to match the method of learning with the material to be learned. Students are able to progress at a rate at which they are capable, after having to demonstrate competence at each level of their courses. Students will be given educational opportunities and choices which are designed to assist them in becoming more self-directed and responsible for their learning.[19]

The following program goals were identified:

1. To create a more personalized and humanistic environment.
2. To provide more direct assistance in educational planning and goal setting through the active participation of students, teachers, parents and Teacher Advisors.

3. To facilitate differing rates of student progress by providing multiple exit and entry points.

4. To focus on demonstrated competence as the criterion for advancing to the next unit or course

5. To provide students with a range of alternatives within the curriculum involving
   - what will be learned
   - how it will be learned
   - where learning will occur
   - when learning will occur
   - who will assist the learning.

6. To provide an educational environment based upon the needs of individual students.

7. To develop student self-direction and responsibility by having the student actively participate in the planning and evaluation of his/her educational program.[20]

In addition, major elements of the program were outlined including the following:

1. The provision for students to learn at different rates (including policies for early and late completion of courses).

2. The provision for students to learn in different ways (including different learning styles and environments).

3. Advancement based on competency (including remedial or enrichment opportunities).

The role of the student, teacher and Teacher Advisor in relation to the program was clearly outlined as was a commitment to parents about their involvement.

While initial development had a department focus, the model became truly school-wide as the need evolved for coordination. A number of administrative policies also grew out of this need as follows:

1. Competency level for courses placed at 50% but variable at the unit level according to the demands of the material.

2. Six course entry and exit points which coincide with the six reporting periods during the year.

3. A six-week extension to a course (i.e., one reporting period) could be negotiated by students depending on commitment, attendance and time on task. Further time could be obtained after extensive consultation.

4. A progress check made for each student in every course every three weeks.

5. An attendance policy which could culminate with a student's withdrawal from a course after 10 absences.

Other support systems which evolved included an extensive Teacher Advisor system, a large test centre, and computerized record keeping and student tracking systems.

Generally speaking, from extended observation in the school over a five-year period, it can be concluded that no classrooms could be considered traditional any longer. Until 1985, an attempt was made to run a two-track school (i.e., traditional and individualized) but as the definition of PACE broadened and became clearer, that concept faded. Instead, students were considered "on PACE" and their instructional needs in each subject were met in the most appropriate way. Thus, in most classrooms, in any one period, a variety of instructional methods could be observed including lecture, small group discussion and independent work. The curricula in all three grades were extensively rewritten into learning guides although many units still required further revision, particularly at the higher levels. Also, due to the broken front approach in the project's developmental phase, some departments had stronger materials than others and format varied widely.

The clerical aide acquired for the project managed the test centre with its parent volunteers and coordinated material production and duplication. By the end of the project, she had a full-time assistant, funded separately through assistance from the federal PEP program, to help handle the volume of tests. In a five-month period in the 1986-1987 school year nearly 9,000 tests were administered and processed.

When in place, the impact of the Manning project was far more vast than could have been foreseen and the degree of change required to make it work was more taxing on personnel than anyone had envisioned. While fully functioning by project end, the program had not had the time to mature and stabilize which would have been desirable. However, results were encouraging.

Study Findings: School-wide Model

This section provides a summary of study findings related to the primary goal established for this evaluation, as outlined previously, and refers specifically to student achievement, curriculum adherence, time removed as a credit requirement and competency becoming the basis for awarding credit.

(a) STUDENT ACHIEVEMENT

In order to identify changes in achievement over time, project students' final grades were analyzed in Math 30, Math 33 and Typing 30 in 1986 and 1987, using analysis of variance procedures.

Student achievement increased significantly in Math 30 from 1986 to 1987. A summary of students' achievement levels for the School-wide Model is provided in Table 10. (Consult Appendix 3 for detailed analysis.)

With regard to achievement level comparisons between project students and their peers within the system and within the province, project students' grades were compared with those of the control groups using analysis of variance procedures.

T A B L E 10

STUDENT ACHIEVEMENT MEAN SCORES

SCHOOL-WIDE MODEL

PROJECT ABC

1986-1987

COURSE	1986 Mean	1987 Mean
MATH 30	60.6	73.3
MATH 33	56.3	55.4
TYPING 30	65.9	70.7

Projects students' grades in Math 30 were significantly higher than those of control groups in 1987. Students' grades in English 30 were significantly lower than those of control groups in the same year. With only one year of statistics available for analysis at the 30-level by the end of the study, it is not possible to draw any conclusions about student achievement in the model. A summary of significant differences in project students' mean scores is provided in Table 11. (Consult Appendix 3 for detailed analysis)

(b) CURRICULUM ADHERENCE

Alberta Education consultants were asked to validate the curriculum of project courses by determining the following two facts:

1. If the contents of each course matched the Program of Studies for Senior High Schools.

2. If the standards applied in each course were comparable to those applied generally across the province.

During the first year of the project, no curriculum was evaluated as the program's focus was on staff development, but for the final four years of the project, Alberta Education consultants visited both core and option courses, spoke with staff members and reviewed instructional materials. (Consult p. 44 for a list of courses reviewed.) The reports prepared by consultants were published annually in the Formative Evaluation Report.

The content of all courses in the program were found to match the Program of Studies for Senior High Schools and some units in English were judged to be exemplary. Many units in most subjects, however, were still evolving by project end.

T A B L E 11

SUMMARY OF SIGNIFICANT DIFFERENCES

BETWEEN SCHOOL-WIDE MODEL

MEAN SCORES AND CONTROL GROUPS

PROJECT ABC

1987

COURSE	YEAR	MODEL MEAN	CBE MEAN	ALBERTA MEAN	STATISTICAL COMPARISON
MATH 30	1987	73.3	67.7	68.3	Significantly Higher
ENGLISH 30	1987	60.8	64.9	65.0	Significantly Lower

The standards of all courses in the program were found to be comparable to those applied generally across the province throughout the project. In 1986, it was found that evaluation criteria were not always clearly outlined for students, again underlining the developmental stage of curricular materials. By the end of the project, most courses were able to provide multiple versions of unit tests for the test centre.

It must be noted that only in the School-wide Model were the principles of individualization and continuous progress applied to a broad spectrum of option courses such as Building Construction, Food Studies, Art and Physical Education. In all cases, teachers appeared to welcome these principles as appropriate for instructional delivery. Areas where individualization and continuous progress were somewhat limited included Music and Drama where group needs were determined to be overriding.

(c) TIME REMOVED AS A CREDIT REQUIREMENT

Data regarding student perceptions about the removal of time as a requirement in the granting of credit were treated in the same manner as that for the two programs described earlier. Consult Appendix 3 for statistical findings.

Of particular interest for the purpose of analysis in the School-wide Model, are data collected for the latter three years of the project because it was during this period that PACE was implemented on a grade-by-grade basis.

Analysis of statistical and interview data collected during these three years indicates that the School-wide Model successfully provided students with a stop mechanism in their studies when they encountered difficulty. While flexibility

regarding learning rate variability and varied course entrance times was certainly in evidence, perceptions regarding the degree of flexibility differed.

Teachers and administrators perceived that the PACE program made provision for varied learning rates according to students' capabilities while student perceptions declined significantly in 1987 from their view in 1986, indicating that varied learning rates were available only seldom or sometimes. Interview data supported this changing perception: in 1986, 80% of students interviewed (n=66) said they could get extra time to complete their course if needed; in 1987, 38% (n=54) agreed, although over one-half of the group admitted having received extra time in at least one course in the past. In fact, the granting of extensions did decline in 1987 when 7.9% of registered students (n=1830) received course extensions as compared to 27.9% (n=816) in 1986. (Consult Table 12.)

The decline in student perceptions in 1987 regarding learning rate variability likely reflected the administrative policies related to time which were implemented in the last two years of the project. Administrators believed in particular that the six-week extension policy cut down on abuse of students' new freedom by encouraging them to focus on the task at hand. However, two-thirds of the teachers interviewed in 1987 (n=9) felt that students did not understand the implications of the six-week entension policy and their own interpretation of student perceptions varied. Overall, it appeared that new expectations had not been completely assimilated.

TABLE 12

STUDENT TRACKING SUMMARY

SCHOOL-WIDE MODEL

PROJECT ABC

1986-1987

YEAR	NUMBER OF COURSES	NUMBER OF STUDENT-COURSE REGISTRANTS	% COMPLETED EARLY	% TOOK SEMESTER	% GRANTED EXTENSION
1986	22	816	14.7%	57.4%	27.9%
1987	26	1830	15.9%	76.2%	7.9%

The impact of new policies related to time was also evident in the significant decline in student perceptions regarding flexible entrance to the next level of a course, again a perception not shared by teachers or administrators. In fact, flexibility was evident in that of 1830 student-course registrants sampled in 1987, 15.4% completed their courses early, compared with 14.7% the previous year (n=816). Early course completers had increased by project end while those granted extensions had decreased.

To conclude, time was removed as a requirement in awarding credit in the School-wide Model. Students were provided with a stop mechanism to deal with difficulty as it was encountered, they were able to complete a course early and to advance to the next course level at six-week intervals, and they could take more time than a semester if it was necessary but had to demonstrate commitment, attendance and time on task. Tightened administrative policies related to time use had negatively influenced student perceptions in 1987 but this view was not shared by teachers or administrators. It was impossible to predict if the decline in student perceptions was temporary; statistical findings remained volatile until project end. Additional time to allow this program to mature would have helped to clarify study findings further. However, it was evident that time use was flexible in this program and that the 125 hour standard had been broken.

(d) COMPETENCY THE BASIS FOR AWARDING CREDIT

Data regarding student perceptions about competency becoming the basis for awarding credit were treated in the same way as for the previous two models. Consult Appendix 3 for statistical findings.

Analysis of both statistical and interview data collected during the study indicates that the School-wide Model was successful in making competency the basis for awarding credit.

The use of tests at the unit level was satisfactory in project terms throughout the project. The test center expanded each year as another grade came on stream and as teachers developed multiple versions of each test. By the end of the project, there were more than 1000 unit tests on file. The centre was coordinated by a full time paraprofessional who was assisted by parent volunteers and a grant-funded support person. On an average day, about 100 students wrote tests there.

Competency was the criterion by which students were judged and allowed to proceed, either to the next unit or the next course level. Overall, 79.6% of students interviewed (n=54) indicated that they could leave a course as soon as they had completed the requirements. They either took a spare period, worked in other courses or began a new course. Teacher and administrator interview data identified variations between subject areas. In particular, it was indicated that English and Social Studies, with their requirements for seminars and group discussion, were less likely to have many students completing early, although some evidence of this did exist.[20] Further, administrators also perceived variation as being related to differences in the personalities of staff members. This observation is supported by findings in the policy Delphi Study that certain teacher characteristics are particularly appropriate for this type of program.[21]

To conclude, based on student, teacher and administrator perceptions, as well as observation, competency became the basis for awarding credit in the School-wide Model and thus this critical project goal was achieved by this school.

To summarize study findings specific to the School-wide Model as it developed at Ernest Manning High School, Project ABC provided a traditional comprehensive high school with a unique opportunity to personalize learning by addressing learning styles and providing for variable learning rates. The school embarked on a complex and far-reaching project with little more than a philosophical stance shared by some key staff members.

Five years later, major changes had happened to staff and students in the way they interacted and to administration in the way it regulated student movement through courses. A Teacher Advisor system had helped to focus student tracking and had improved communication throughout the school and between the school and the home. Students and teachers had adapted to the concept of six entry and exit points in the school year so that student advancement to other courses was visible every six weeks rather than at semester end. A glance at any class list revealed the variety of grades represented by students attending any one particular course. Teaching methods had broadened considerably and class structures were more flexible. At the same time, a clearer focus on excellence was evident and students generally appeared more task-oriented and goal-directed. Despite the strain experienced by staff in effecting such a major shift by project end, teachers and administrators appeared positive and committed to the changes they had wrought, encouraged by the evidence they were receiving of project success.

Achievement of students in the school at the end of the project tended to be equivalent to achievement levels in both local and provincial programs. The exceptions were Math 30 in which project students' achievement was significantly higher than control groups and English 30 in which project students' achievement was significantly lower than control groups. With only one year of Grade 12 results available for analysis by the end of the study, it was not possible to draw any significant conclusions about achievement in this model.

The curricula offered to students met with provincial requirements in terms of standards and content. Time was removed as the critical variable in awarding credit although student perceptions were negatively affected toward the end of the project by tightened administrative policies. Competency became the basis for awarding credit. While the program needs at least two more years to stabilize and mature, the components of a time-credit alternative have been successfully put in place and staff should be commended for their commitment and tenacity in achieving Project ABC goals.

CHAPTER 5 - OVERALL STUDY FINDINGS

The purpose of this chapter is to assess the success of the three project models in providing their students with acceptable alternatives to traditional time-credit relationships with regard to student achievement, curriculum adherence, removal of time as a credit requirement and the utilization instead of competency as the basis for awarding credit. Further, a discussion regarding province-wide application of project principles will be advanced and, finally, some budget considerations for a Project ABC-type program will be outlined.

Student Achievement

The evaluation goal regarding student achievement stated that project students' achievement was to be as good as or better than achievement levels in both local and provincial programs. Specifically, research questions asked the following:

1. *What changes occurred in the achievement of project students during the course of the project?*
2. *How did achievement levels of project students compare with those of non-project students within the system and within the province?*

With regard to changes in achievement of project students over time, little significant change was recorded. Out of a total of 44 courses tracked over time, the mean scores in only three courses, one in each model, changed significantly during the project.

In the Department-based Model, there was a significant decrease in students' mean scores in Accounting 30 from 1984 to 1986. In the

Parallel Core Program Model, there was a significant increase in Chemistry 30 mean scores from 1986 to 1987. In the School-wide Model, mean scores increased significantly in Math 30 from 1986 to 1987.

With regard to achievement level comparisons between project students and their peers within the system and within the province, again few significant differences were identified. (Consult Table 13).

Out of 12 mean score comparisons in the Department-based Model, only three mean scores of project students were significantly different from their peers in the control groups. In 1985, students' achievement for Typing 30 was significantly lower than the achievement of students in the system and the province while achievement for Law 30 was significantly higher. In 1986, achievement for Accounting 30 was significantly lower than the achievement of the control groups. The other 9 mean score comparisons yielded no significant differences.

In the Parallel Core Program Model, out of 21 mean score comparisons, only one course in one year was significantly different. In 1987, students' achievement in Chemistry 30 was significantly higher than the achievement of students in the system and the province. The other 20 mean score comparisons yielded no significant differences. Generally, course achievement levels in the Parallel Core Program Model tended to be somewhat higher than the achievement of control groups although not statistically significant.

Comparisons were limited in the School-wide Model as the program developed to the Grade 12 level only late in the study. Three courses were compared for two years and five courses for one year. In 1987, students' achievement in Math 30 was significantly higher and in English 30 significantly lower than the achievement of control groups. The other nine mean score comparisons yielded no significant differences.

TABLE 13

STUDENT ACHIEVEMENT MEAN SCORE COMPARISONS OF PROJECT MODELS WITH CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA MEAN SCORES

PROJECT ABC

1983-1987

MODEL	# MEAN SCORE COMPARISONS	MEAN SCORE SIGNIFICANTLY HIGHER THAN CONTROL GROUPS	MEAN SCORE SIGNIFICANTLY LOWER THAN CONTROL GROUPS
DEPARTMENT-BASED MODEL	12	LAW 30 (1985)	TYPING 30 (1985) ACCOUNTING 30 (1986)
PARALLEL CORE PROGRAM MODEL	21	CHEMISTRY 30 (1987)	
SCHOOL-WIDE MODEL	11	MATH 30 (1987)	ENGLISH 30 (1987)
TOTAL	44	3	3

To conclude, achievement levels in Project ABC courses did not appear significantly affected by program changes resulting from either the removal of time as a credit requirement or the use of individual competency as the basis for awarding credit. While achievement levels in the Parallel Core Program Model tended to be somewhat higher than that of control groups and achievement levels in the Department-based Model tended to be somewhat lower, achievement data were too limited in the School-wide Model to determine tendencies in that model.

Curriculum Adherence

The evaluation goal regarding curriculum adherence simply stated that the Alberta Curriculum be adhered to in project schools. This report was to serve as the means of informing Alberta Education about curriculum adherence. The research question on this topic asked the following:

> ***Did the curriculum offered to project students adhere to the curriculum requirements of Alberta Education?***

Throughout the project on an annual basis consultants from Alberta Education validated project curricula by determining the following two facts:

1. If the content of each course matched the Program of Studies for Senior High Schools.
2. If the standards applied in each course were comparable to those applied generally across the province.

Based on the reports submitted by these consultants, it can be concluded that the content of all Project ABC courses either matched the Program of Studies for Senior High Schools or did not differ significantly. Further, standards in all project courses were found to be comparable to those applied generally across the province.

Several unanticipated outcomes were noted which relate to curriculum. The first was the high degree of congruence between provincial requirements and project courses. It was evident that teachers had referred extensively to their curriculum guides in the generation of new materials and that they tended to be more confident than non-project teachers about their adherence to provincial requirements.

A second unanticipated outcome related to the quality of materials prepared. In some cases, particularly in the Parallel Core Program Model, materials were found to exceed provincial requirements and to exemplify curricular excellence.

Two other indirect but related outcomes were identified in the 1987 policy Delphi Study.[1] In their quest to develop individualized materials, teachers experienced professional growth through increased exposure to new ideas and increased opportunity to experiment. Delphi panelists also perceived that students had gained responsibility, independence and confidence because of the requirements the individualized content placed on them.

To conclude, the development of individualized materials in Project ABC did not have a negative effect on either the content or standards of courses offered, and in fact in some cases, particularly with regard to the Parallel Core Program Model, materials were judged to be superior.

Removal of Time as a Credit Requirement

The evaluation goal regarding time use stated that time was to be removed as a requirement in awarding credit. The research question asked the following:

> ***To what extent was time removed as a requirement for obtaining credit?***

The key concepts or variables identified as critical to this goal included:

1. Stop Mechanism
2. Learning Rate Compatible with Ability
3. Flexible Entrance to Next Course Level

For the summative analysis, these three variables were subjected to a univariate analysis of variance of the related student questionnaire responses in 1987 comparing responses among the three models. The program employed was the SPSS ONEWAY with *post hoc* testing. Consult Appendix 4 for statistical findings.

The provision of a stop mechanism for students encountering difficulty was evident in all three Project ABC models according to student, teacher and administrator perceptions. Opportunity was provided for greater one-on-one interaction between students and teachers than is found in the traditional classroom due to both exemption from Carnegie Unit restrictions and the individualization of instructional materials. The increased contact between students and teachers resulted in improved communication and higher satisfaction for both groups.

Flexible course entrance was available to students in both Department-based and School-wide Models. In both cases, once a student had demonstrated satisfactory achievement of course requirements, entry to the next course level was possible. The Parallel Core Program Model did not provide this option to students as the concept of continuous progress was not adopted in this school.

Varied learning rates were addressed in both Department-based and School-wide Models although, in both models, variability was more evident to teachers and administrators than it was to students.

In the Department-based Model, general deadlines were provided to guide students through their courses. Those who could complete a course in less time were encouraged to do so. Those who took longer than the norm were handled on an individual case basis.

In the School-wide Model, policies were developed to provide for learning rate variability in six-week blocks. In other words, a student had the chance to complete a course and start the next level every six weeks. Although most students continued to take a full semester to complete a course, early completion was also evident. Students could be granted a six-week course extension (or even more time after extensive consultation) if they could demonstrate that they were on task. Implementation of the six-week extension policy was tightened in the last year of the project when it was found that some students were expecting an extension rather than earning it and this tightening was perceived negatively by students. It will take more time before the new administrative expectations are assimilated.

Varied learning rates were addressed in the Parallel Core Program Model within the individual unit. Students had a great deal of flexibility in determining how much time they spent on each of their core courses at the unit level and variability of time on task was great. However, students could not vary their learning rate in terms of the semester or year because the group progressed together from unit to unit. For students completing their work early, enrichment was provided. For those requiring longer than the norm, remedial work was provided concurrently with progression to the next unit.

A major unanticipated outcome which emerged from the project with regard to the removal of time as a credit requirement was the different use of time which developed in the Parallel Core Program Model. The program broke the Carnegie Unit because the number of hours a student spent during the school year on a particular course tended to vary from the traditional 125 hours based on a student's perceived learning needs. However, the student was held in a lock-step format as the class progressed from unit to unit, and so time use remained traditional from the perspective of the school year.

A second unanticipated outcome was the variety of policies and procedures which were developed by staff to handle time use with regard to varying learning rates. Each school developed a unique approach to the deregulation of time. Rather than converging over time, each program became more distinct.

To conclude, all three models provided evidence that they had functioned outside of the restrictions of the Carnegie Unit, allowing students more or less time as their learning needs dictated. However, while the Department-based and School-wide Models provided for continuous and individualized progress from unit to unit and from course level to course level, the Parallel Core Program Model did not adopt continuous progress as a delivery system but focussed on enrichment instead.

Competency as the Basis for Awarding Credit

The evaluation goal regarding competency stated that competency was to be made the basis for awarding credit. The research question asked the following:

> *To what extent was competency established as the requirement for obtaining credit?*

The key concepts or variables identified as critical to this goal included:

1. Test use at the unit level
2. Demonstrated competence before proceeding to the next unit
3. Advancement based on competency, not time

For the summative analysis, these three variables were subjected to a univariate analysis of variance of the related student questionnaire responses in 1987 comparing responses among the three models. The program employed was the SPSS ONEWAY with *post hoc* testing. Consult Appendix 4 for statistical findings.

The use of tests at the unit level was evident in all three Project ABC models, according to student, teacher and administrator perceptions. In all cases, students had a degree of choice in determining when they would write their tests and also, in all cases, the testing function was separated from the instructional one. The Parallel Core Program and School-wide Models had separate test centres while the Department-based Model had a designated space in the open area for testing. Test administration and filing were handled by paraprofessionals or parent volunteers. In many cases, multiple versions of tests were developed and each model developed its own security measures. Despite a perceived increase in workload for teachers facing a variety of tests requiring marking daily, they were generally satisfied with the separation of the testing function and supported student choice in determining timing.

At the unit level, students were required to show subject matter competency before advancing to the next unit in the School-wide Model. Views differed in the Department-based Model on this topic. Teachers and administrators agreed that competency was required but students perceived this to be the case only sometimes. There appeared to be a relationship between the nature of the curriculum and the competency requirement. In courses where material was non-sequential, students could redo successful units at the end of the course and in those cases advancement to the next unit was not competency-based. In the Parallel Core Program Model, while competency was a great concern to teachers, individual advancement based on competency at the unit level was not permitted.

The replacement of time spent in a course with student competency as the criterion for advancement was successfully effected in both the Department-based and School-wide Models. In the Parallel Core Program Model, student competency was the criterion for awarding credit but individual advancement to the next course level was not possible. Instead, student selection procedures, extensive one-

on-one interaction between students and teachers, and the development of materials to address varied learning styles were all ways in which student success in the program was fostered.

A major unanticipated finding was the perception by policy Delphi panelists that teachers were experiencing greater job satisfaction due to their ability to meet individual student needs.[2] This was coupled with the panelists' perception that a major positive impact on students was the opportunity for increased contact with their teachers on a one-on-one basis.

To conclude, competency became the basis for awarding credit in the School-wide Model. It was also the case to a large extent in the Department-based Model, although some non-sequential materials were handled differently at the unit level. In the Parallel Core Program Model, competency was the criterion for awarding credit within the traditional parameters of semester or school year but there was no provision made for individual advancement at either the unit or course level. Appropriate student selection and a variety of excellent instructional techniques helped to ensure that students would succeed within the time limits provided.

Considerations for Provincial Application

The evaluation goal with a provincial focus states that Alberta Education be provided with information for use in the consideration of province-wide application of alternatives to time credit. Initially, no research questions were developed on this goal but in 1987 the Project ABC policy Delphi Study helped to provide this information. The Delphi panel consisted of 21 Project ABC teachers and administrators. Research questions developed for that study were as follows:

1. *What benefits accrued to project schools as a result of Project ABC?*

2. *What disadvantages or problems resulted in project schools because of Project ABC?*

3. *What changes would project staff recommend if they were doing the project over again?*

4. *What essential components would another school or school system need to set up an alternative to time-credit program?*

In addition, Alberta Education consultants who were reviewing Project ABC curricula were asked two additional questions in 1987 which were:

1. *Are the methodological approaches used in this course educationally sound?*

2. *Could this course/program be offered in a similar manner in another school in Alberta? What critical factors would have to be taken into account?*

The considerations advanced in this section are based on data collected for these unique final year activities as well as data from the formative evaluation activities conducted in 1987.[3]

Project Benefits

Benefits were divided into three groups: benefits for *students*, benefits for *teachers* and benefits for project *schools*.

The most important benefits accruing to ***students*** because of their involvement in Project ABC as perceived by staff are listed below. (The mean response on the Delphi is indicated in parentheses to show strength on a Likert-type four-point scale where 1 = Most Important and 4 = Not Important.)

1. Opportunity for students to assume more responsibility for their learning. (Mean = 1.3)

2. Opportunity for increased one-on-one student contact with teachers. (Mean = 1.4)

3. Development of student independence and confidence. (Mean = 1.4)

4. Availability of alternatives for different learning styles. (Mean = 1.6)

5. Opportunity for students to learn at their own rate. (Mean = 1.7)
6. Availability of different learning environments. (Mean = 1.8)
7. Availability of different learning materials. (Mean = 1.9)

Student interviews conducted in 1987 revealed support for all of the above-mentioned benefits. They were particularly satisfied with the opportunity afforded them to learn at their own rate and to work one-on-one with their teacher judging from the frequency of their comments.

The most important benefits to *teachers* were identified by project staff as including:

1. Increased freedom and opportunity to experiment outside of the traditional delivery system. (Mean = 1.5)
2. Increased exposure to new ideas. (Mean = 1.6)
3. Development and continued evolution of a body of curricular materials. (Mean = 1.6)
4. More teacher involvement in decision making. (Mean = 1.7)
5. Greater teacher satisfaction due to their ability to meet individual student needs. (Mean = 1.8)
6. Increased awareness of different teaching styles. (Mean = 1.8)
7. Increased teamwork among teachers. (Mean = 1.8)
8. Increased funding for staff development. (Mean = 1.9)
9. Increased awareness of different learning styles. (Mean = 1.9)

Teacher interviews conducted in 1987 supported these perceived benefits with particular support given to awareness of different teaching styles, increased satisfaction and increased opportunity to experiment. Comments by Alberta Education consultants indicated that not only were teachers aware of different teaching styles, they were demonstrating them effectively in the classroom and should act in the future as in-service leaders to pass on these well-developed skills. Administrators and teachers at William Aberhart High School agreed that even though the English Department's short-term involvement in Project ABC was judged to

be unsuccessful, the teachers gained some long-term benefits in terms of more varied teaching styles and a greater willingness to adopt new ideas.

The most important benefits accruing to project *schools* were perceived by staff to include the following:

1. The promotion of an atmosphere of cooperation between staff and students. (Mean = 1.7)
2. Increased funding for the school. (Mean = 1.9)
3. Effective experimentation with and use of paraprofessionals. (Mean = 2.0)

Teacher interviews indicated particular support for the added resources the schools had obtained through involvement in the project. Particular benefits identified included the paraprofessionals, improved library resources and additional computers, materials and other instructional equipment.

Project Problems

The most serious problems or disadvantages experienced by *students* in Project ABC as perceived by staff are listed below. (Again, a four-point Likert-type scale was employed where 1 = Most Serious and 4 = Not Serious. Note that the means are lower than those for program benefits.)

1. Lack of understanding about the demands of the program by students. (Mean = 2.4)
2. Lack of student responsibility in completing courses by the end of the semester. (Mean = 2.5)
3. Poor student response to the freedom allowed in the program. (Mean = 2.6)
4. Increased amount of cheating in the test center. (Mean = 2.7)

Student interviews supported the third problem area as over one-third of Grade 12 students interviewed identified the biggest disadvantage they had encountered in the project was the ease with

which one could fall behind and the difficulty involved in catching up again.

The most serious problems or disadvantages encountered by *teachers*, according to the perceptions of Delphi panelists, included the following:

1. Stress, frustration and burnout. (Mean = 2.1)
2. Increased workload. (Mean = 2.2)
3. Vague vision, goals and incentives. (Mean = 2.5)
4. Lack of understanding about the demands of the project. (Mean = 2.6)
5. Loss of confidence in leadership. (Mean = 2.6)
6. Lack of consultation. (Mean = 2.9)
7. Staff turnover. (Mean = 3.0)

Throughout the project, stress and increased workload were observed on the part of project teachers; however, for the most part it must be emphasized that their commitment level was a good deal higher than their frustration level, particularly once benefits to students became apparent and once initial curriculum development had been achieved. With regard to clarity of goals - throughout the project, there was an underlying current of opinion among teachers at Ernest Manning High School that the School-wide Model should actually provide for a non-project stream. This issue was never fully resolved to their satisfaction as they were evenly divided on the issue identified by the policy Delphi, *"Is an ABC program appropriate for every student?"* In their final interviews, six out of nine teachers at that school still believed that students should have a choice.

The most serious problems or disadvantages experienced by project *schools* were as follows:

1. Need for extra clerical support. (Mean = 2.1)
2. Need for extra funding for aides, paper, word processing and photocopying. (Mean = 2.3)

3. Lack of strong leadership. (Mean = 2.5)
4. Public relations difficulties with feeder junior high schools. (Mean = 2.5)
5. Low morale. (Mean = 2.6)
6. Unequal distribution of class loads. (Mean = 2.8)
7. Unclear priorities. (Mean = 2.8)
8. Poor public relations with parents. (Mean = 2.8)
9. Integration of the Teacher Advisor system with the project. (Mean = 3.0)

Interviews with project administrators in 1987 indicated that the project required more complex management of resources in terms of space, staffing and materials. A number of the other problems identified here, such as poor public relations, tended to be of a developmental nature and many were in hand by the end of the project.

Essential Components for an Alternative Program

Data collected in the policy Delphi study for the two research questions related to recommended changes and essential components tended to overlap and so were reported together under the topic of essential components. A list of key components for a Project ABC-type program was generated by Delphi panelists. These are outlined below in descending order of importance along with other supporting evidence and observations collected over the course of this study.

KEY COMPONENT	COMMENTS
1. Specially selected teachers	The Delphi also produced a list of critical teacher characteristics which includes the following: (a) Willing to make changes. (b) Prepared to work hard. (c) Receptive to new ideas. (d) Energetic and enthusiastic. (e) Flexible. (f) Willing to be part of a team. (g) Supportive of project philosophy.

KEY COMPONENT	COMMENTS
1. Specially selected teachers (continued)	In both interviews and informal discussions, administrators strongly supported the need to select their own staff.
	Alberta Education consultants most frequently mentioned teacher commitment as a critical factor in program replication. It was also suggested that transfer out of an alternative program should carry no stigma.
2. Support and commitment from the local board and government	Alberta Education consultants identified a committed system administration as a critical factor.
	They also identified community support as another critical factor.
3. Adequate time for curriculum development and revision with sufficient lead time prior to program initiation	Strongly supported by Alberta Education consultants.
	Development of test banks to complement courses or at least parallel versions of tests were also supported.
4. Strong, decisive and creative leadership at both department and school levels	This complements the problem area identified elsewhere in the Delphi related to lack of strong leadership.
5. A sound educational base	Educational theory remained important throughout the study and was reflected in the ongoing need for staff development and orientation.
6. An effective student tracking system to monitor progress and provide feedback	Increased workload observed throughout the project.
	Individualized instruction necessitated new tracking and record keeping systems, a number of which were developed successfully on the computer.
7. Clear and consistent policies, expectations and consequences for students	Student orientation and a phase-in period seemed to be essential to smooth program operation.
	Teachers found that students required a certain amount of re-learning each year about time management skills, organizational approaches and school policies.
	The project stress on school policy development related to time use and attendance emerged from perceived needs in this area.

KEY COMPONENT	COMMENTS
8. A school-wide philosophy	This was reflected in the need for a clear vision and goals shared by all staff. An outstanding issue was whether or not the program should be for all students.
9. Adequate clerical and support staff	Differentiated staffing was well implemented in this project to support the process of individualization. Alberta Education consultants saw clerical assistance and support staff in both the library and test centre as critical factors.
10. Adequate teacher in-servicing, professional development and release time for planning and coordination	New teacher orientation was viewed as critical by administrators. Alberta Education consultants supported ongoing in-service and release time.
11. Sufficient funding to institute and maintain the program	Start-up costs were perceived as different from maintenance costs. Lack of adequate start-up costs was seen as a factor in the failure of the English Department's venture into an alternative program at William Aberhart High School. (Also consult Financial Considerations, below.)
12. Adequate one-on-one interaction with students	The experience with the drop in enrolments in the Business Education Program at William Aberhart High School seems to indicate that there is a minimum number which must be served by such a program to provide for adequate student-teacher interaction. It is possible that a maximum number also exists.
13. Involvement of total school staff in program development	Teacher involvement in decision making was perceived as a benefit and a number of teachers experienced professional growth as a result. Close links maintained between PEP and Non-PEP teachers at John G. Diefenbaker High School dispensed with a lot of potential communication problems.
14. A flexible timetable	This component was handled individually by each model which suggests the conclusion that the timetable should emerge from the needs of a specific model.
15. Good liaison with feeder schools	As the models matured, they became more aware of public relations needs outside the school. This is an ongoing challenge.

KEY COMPONENT	COMMENTS
16. Contact with experienced staff in similar programs and sufficient research prior to program implementation	While the out-of-country travel supported by this project will not likely be repeated, schools initiating similar projects can benefit from information provided in this document and by contact with staff members in the three Project ABC schools.
17. Clear and consistent communication with parents	Again, community support was cited by Alberta Education consultants as a critical factor. As the models matured, their relations with parents became clearer and more positive.
18. Extra funding for photocopying and word processing	As stated in No. 11 above, maintenance costs were seen as essential.
19. Gradual implementation of the alternative program	The experience of two of the models indicated that it was appropriate to develop the program in one grade at a time.
20. Student choice between the alternative and a traditional program	As mentioned above, this component remained unresolved. In the Parallel Core Program Model, support was unanimous for a two-stream approach. In the School-wide Model, Delphi panelists were evenly divided. Results were also divided from the Department-based Model but with only two panelists involved, a conclusion could not be drawn.

One final critical component which was not identified in the policy Delphi, but which emerged from both the comments of Alberta Education consultants and final-year interviews with teachers, administrators and students, was the need for a flexible facility with different-sized instructional spaces.

To conclude, information has been provided in this section for the consideration of Alberta Education in terms of province-wide application of alternatives to time credit. Project benefits drew higher mean scores from Delphi participants than did project problems or disadvantages highlighting the perceived overall value attributed to the project. The project benefits receiving highest mean scores were those related to students, followed by benefits

to teachers and, finally, benefits to the schools. A list of 20 key components for a Project ABC-type program was developed. The most critical item identified was the need to select teachers based on specific characteristics.

Budget Considerations

For any school contemplating the initiation of a Project ABC-type program, there are primary budget considerations to be addressed. These programs are ***different***; therefore, different approaches to budgeting should be carefully considered before setting out in new directions.[4]

The essence of the program difference lies in the terms ***personalizing*** or ***individualizing*** the educational delivery system. If students are to proceed only when and if they are competent to proceed, then it follows that large groups of students travelling together at a teacher-directed pace will conflict with the concept of advancement based on competency. By emphasizing the uniqueness of each student there must be a different emphasis in the school budget. The main areas affected include resources, staff and the budgeting philosophy.

Resources

There are two main types of resources affected by a Project ABC-type program, namely instructional materials and information processing facilities and supplies.

As the class set of texts approach is not appropriate for an individualized program, instructional materials available need to be expanded. In the first place, students must have access to a broader range of materials if they are to investigate personal initiatives as opposed to teacher-directed ones. Secondly, the individualized delivery system requires that more copies of audio-

visual resources be available. Finally, increased use of resources requires stepped-up security and results in increased maintenance.

Because the curriculum is rewritten into smaller chunks and is cast into a variety of learning style formats, and because record keeping needs are more complex, demands on information processing facilities in the school are greatly increased. In the first place, teachers and administrators require greater access to computers and word processors than is the case in a traditional program. Secondly, photocopying becomes a major activity and facilities may need to be upgraded to handle the volume. And thirdly, related to both of the above, paper costs can be expected to rise substantially.

Staff

Staff costs are increased in three different ways. The first is an increased requirement for ***paraprofessional and clerical support***. For student tracking, the organization and production of materials, test supervision, and lab work coordination, non-instructional personnel have proven to be invaluable, freeing teachers to address the myriad of instructional demands placed upon them by an individualized program.

Secondly, ***professional development*** is essential. Even with specially selected staff, as is recommended in this report, professional development is required to clarify and solidify the philosophical underpinnings of personalized and individualized education. In addition, curriculum rewriting is a complex task and may require support from knowledgeable professionals. There is also an ongoing orientation component to be aware of. Every new teacher to the team requires some intensive, fast tracking professional development to allow them to catch up with their colleagues.

Finally, initial *teacher release time for curriculum development* is necessary to allow the transition to take place. Project schools found it more effective to add an extra staff member to a department temporarily who could release colleagues for curriculum development for large chunks of time, such as six weeks at a stretch, rather than trying to replace teachers with substitutes on a day-by-day basis. Although most of the cost for curriculum development is up front, there are some minor ongoing release time costs for planning and curriculum revision.

Budgeting Philosophy

For a school to be successful in implementing the above-mentioned budget changes, it appears that a system budgeting model may be unsuitable if too many system considerations are overriding. This suggests that a school-based decentralized budgeting model is more appropriate. This is particularly true with regard to determining the number and type of professional, paraprofessional and clerical staff required to run the program. A decentralized budget would allow some differentiated staffing and resource management decisions to be made at the school level.

Five years of experience in Project ABC have led school administrators to conclude that implementing a Project ABC-type program has some budgetary implications. More resources are required in the areas of instructional materials and information processing. Staff costs include an increased requirement for professional development and new staff orientation, release time for initial curriculum development and ongoing curriculum revision, and an increased need for paraprofessional and clerical support. However, the implementation of a decentralized budgetary model can allow these more complex resource management issues to be resolved at the school level.

CHAPTER 6 - SUMMARY, CONCLUSIONS, RECOMMENDATIONS AND IMPLICATIONS

This final chapter presents a brief summary of the evaluation study for Project ABC and some conclusions based on study findings. Recommendations emerging from the study are presented and are followed by some of the implications of Project ABC.

Study Summary

Project ABC: Advancement Based on Competency was a five-year study conducted from 1982-1987. It was funded jointly by Alberta Education and the Calgary Board of Education for a total of $999,950.

Purpose

The purpose of Project ABC was to explore alternatives to the Carnegie Unit in three Calgary high schools. It provided these schools with the opportunity to remove the fixed time-credit relationship and to replace it with continuous progress based on individual competency. A formative evaluation was conducted in each of the study's five years and this summative evaluation was completed at the end of the project.

Background

The Carnegie Unit was established in 1907 to regulate the distribution of college pension funds but quickly came to standardize the quality of high schools in North America. Currently in Alberta, one credit requires a minimum of 25 hours of instruction; thus, a five-credit course requires a minimum of 125 hours of

instruction. It has long been felt, however, that more or less than the 125 hours might be more appropriate for an individual student's learning needs than the traditional requirement.

A review of the literature revealed that the idea of breaking the Carnegie Unit occurred as early as 1932. A long-buried study entitled the Eight-Year Study was conducted in the United States from 1932-1940, funded by the Carnegie Corporation and the Rockefeller Foundation. It explored ways of improving high school effectiveness and experimented with flexible time use in the high school. Thirty schools across the country were released from the usual subject and unit requirements for college and university admission for a period of eight years. Each school developed its own model. Some of the innovations which emerged included a school-determined curriculum, student-centred instruction, increased student challenge, a Teacher Advisor system, joint decision making by teachers and administrators, increased parent involvement and careful evaluation. The students were also followed through their university careers and were found to earn higher grade averages than their control groups in all subject areas but foreign languages. Another interesting outcome was the higher percentage of non-academic honours earned by these students who were judged to be more motivated, resourceful, objective and aware than their peers. It was concluded that departures from the prescribed patterns of both time use and curriculum did not lessen the students' readiness for college and, in fact, that the more fundamental the changes initiated by the high school the better the students achieved in college.

A teacher from one of the original 30 schools came to influence Project ABC indirectly. J. Lloyd Trump went on to direct the Model Schools Project for the National Association of Secondary School Principals in 1968. One of those schools was Bishop Carroll High School in Calgary which served as a reference for Project ABC.

Project ABC evolved from an interest held by Alberta Education in exploring alternatives to the Carnegie Unit and by a perceived need by the Calgary Board of Education to address the needs of dysfunctional students whose needs were not then being met by the high school.

Each of the three high schools involved in Project ABC developed its own model and each is outlined in turn.

DEPARTMENT-BASED MODEL - WILLIAM ABERHART HIGH SCHOOL BUSINESS EDUCATION PROGRAM

The Department-based Model was housed in an attractive carpeted open area in an upstairs wing of William Aberhart High School. The individualized instruction and continuous progress employed in the delivery of the program enabled all Business Education 20- and 30-level courses to be offered simultaneously throughout the day, thus accommodating the demands of most students' timetables. Students were able to progress from course level to course level as they completed course requirements. Teachers circulated in the open area discussing specific problems. A clerical aide provided support for material coordination and tracking and record-keeping activities. While the area could house 106 students at a time, it was seldom full by project end due to declining enrolments in the Business Education program. Causes for the decline were perceived to be largely external to the department and included implementation of the Grade 12 Diploma Examinations and the recommendations of the Secondary Education Review, both of which encouraged students to focus on core curriculum areas. Further, within the school, the growth of the Bilingual Program restricted students' involvement in option areas. The decline in enrolment threatened continuation of the open area as teachers began to be required to teach elsewhere in the school. Despite problems encountered by the program, it remained at project end viable in concept, mature and smoothly operating.

PARALLEL CORE PROGRAM MODEL - JOHN G. DIEFENBAKER HIGH SCHOOL
PEP (PERSONALIZED EDUCATION PROGRAM)

The Parallel Core Program Model operated in John G. Diefenbaker High School and provided a school-within-a-school model for core courses involving approximately 100 students in each of Grades 10 through 12. Students were selected for the program based on the results of a learning independence test, parent permission and student motivation. A combination of flextime and demand time was used by students to organize their school day according to their perceived learning needs for each of the core areas. Students attended regular classrooms for their option courses. Time management skills were stressed. A Teacher Advisor System was used to help with student tracking and communication. A test centre, staffed by parent volunteers, facilitated the program as did paraprofessional assistants in the Science Lab area and in the Math area. By 1987, 34% of the school's population, or 350 students were in this program. Throughout the project, students in the Parallel Core Program Model expressed significantly greater satisfaction than the control group of students in the school's regular program with the way the program was set up, with teacher interest in students and with communication both with teachers and their peers.

SCHOOL-WIDE MODEL - ERNEST MANNING HIGH SCHOOL
PACE (PERSONALIZED AND CONTINUOUS EDUCATION)

The School-wide Model at Ernest Manning High School turned a traditional comprehensive program into an individualized and continuous progress model for Grades 10 through 12. The project grew to encompass the whole school, although Grade 12 was operational only during the final year of the project. Model implementation was a vast undertaking and required a great deal of time to realign staff philosophy and define goals and processes. By project end, the school had provided students with a personalized learning environment where differing learning rates and different

learning styles were addressed. In most classrooms, at any one time, a variety of instructional methods could be observed, including lecture, small group discussion and independent work. A clerical aide managed the test centre with the support of parent volunteers, and a Teacher Advisor system fostered communication with students and their parents. The program was fully functional by the end of the project but needed more time to mature.

Study Design

A Steering Committee comprised of representatives from both Alberta Education and the Calgary Board of Education guided the evaluation of Project ABC and developed a series of evaluation goals, as follows:

1. Primary Goals

   To assess the success of project schools in providing students with acceptable alternatives to the time-credit relationships expressed in the current Junior and Senior High School Handbook where:

   (a) The student achievement level is as good as or better than achievement levels, in both local and provincial programs.

   (b) The Alberta Curriculum is adhered to.

   (c) Time has been removed as a requirement in awarding credit.

   (d) Competency has been made the basis for awarding credit.

2. Secondary Goals

   (a) To provide project schools with information concerning students' educational experiences in terms of the principles of personalized instruction and continuous progress.

   (b) To provide Alberta Education with information regarding adherence to the Alberta Curriculum in project schools.

   (c) To provide Alberta Education with information for use in the consideration of province-wide application of alternatives to time credit.

Further, several key concepts were defined by the committee. *Personalized instruction* was defined as including:

1. Placement appropriate to learning style
2. Varied learning environments

3. A "stop mechanism" for students to obtain assistance at any point in a course
4. Demonstrated competency in each unit of a course before proceeding to the next unit
5. Opportunities for enrichment

Continuous progress was defined as including:

1. A learning rate compatible with ability
2. Flexible timetabling to accommodate personal choice or need
3. Advancement based on competency demonstrated rather than time spent in a course

Later in the project, school personnel defined the concept of *competency* as follows:

> Students must demonstrate a competency level of at least 50% in a unit or course before proceeding to the next unit or course. However, in certain cases, higher competency levels for particular units may be required (e.g., Safety Unit in Chemistry).

Based on these goals, a series of research questions was developed and an evaluation study was designed. There were two distinct parts to the evaluation: the formative evaluation which involved an annual cycle of evaluative activites culminating in an annual Formative Evaluation Report; and the summative evaluation which is presented in this document.

The Formative Evaluation Reports (Years One to Five) focussed on the concepts of personalized instruction and continuous progress which were of particular interest to the schools' planning process. The reports provided feedback to the schools regarding their progression toward project goals. Students, teachers and administrators in both models and control groups completed attitudinal questionnaires. Perceptions which were significantly different among project groups formed the basis for interview questions for samples of the three participant groups in each model. The final grades of project students were compared to individual model control groups' grades as well as to system-wide and province-wide mean grades. The Summative Evaluation Report

presented here has focussed specifically on the evaluation goals identified by the Steering Committee which were of particular interest to Alberta Education. Key variables were extracted from the attitudinal questionnaires administered from 1983 to 1987 and were analyzed for changes over time and for differences among models in the last year of the project using univariate analysis of variance. In a similar way, achievement data of project students in 30-level courses were analyzed for change over time within each model and, in the final year, between project students and those in the system and the province. In addition, a policy Delphi study was conducted with a panel made up of project teachers and administrators. This provided additional useful background information which is reported here such as perceived project benefits and problems, important teacher characteristics and key components of an alternative to time-credit program.

In brief, the Summative Evaluation Report focussed on six main areas as follows:

Student Achievement

(a) Within each school over time

(b) Between each school and the city and provincial control groups

Curriculum Adherence

(a) Content match

(b) Standards comparability

Removal of Time as a Credit Requirement

(a) Use of a Stop Mechanism

(b) Provision of flexible entrance to next level of a course

(c) Course learning pace compatible with student ability

Competency as the Basis for Awarding Credit

(a) Use of tests at the unit level

(b) Demonstration of competency at the unit level before proceeding

(c) Advancement to the next course based on student competency, not time spent

Considerations for Provincial Applications

Budget Considerations

Study Findings

What follows is a summary of study findings related to the six areas outlined above.

STUDENT ACHIEVEMENT

For the summative evaluation, student achievement scores for 30-level courses in project schools were compared with the scores of all Calgary Board of Education students and all Alberta students registered in those courses using the computer program Statistical Package for the Social Sciences (SPSS-X) ONEWAY procedure, a univariate analysis of variance which identified significant differences between mean scores over time and between project mean scores and control group scores. This was followed by *post hoc* testing using the Scheffé procedure which helped to pinpoint those differences.

Study findings indicated that achievement levels of students within each program did not vary significantly over the course of the project. Achievement did tend to be somewhat higher in the Parallel Core Program Model and somewhat lower in the Department-based Model but not to a statistically significant degree. Enough data were not collected in the School-wide Model by project end to determine tendencies in achievement levels. Achievement levels did not appear to be negatively affected by program changes resulting from the implementation of Project ABC. Overall, achievement levels of project students were generally comparable with achievement levels of non-project students in the Calgary Board of Education and the Province of Alberta. It was concluded that the project evaluation goal related to student achievement had been achieved and that student achievement levels in Project ABC were as good as achievement levels in both local and provincial programs.

CURRICULUM ADHERENCE

Curriculum developed by Project ABC teachers was reviewed annually by consultants from Alberta Education to see if content or standards in project courses remained comparable to those across the province. In their opinion, the development of individualized materials did not have a negative effect on either the content or the standards of courses offered in Project ABC, and in some cases, particularly in the Parallel Core Program Model, materials were judged to be superior. It was concluded that the project evaluation goal related to adherence to the Alberta Curriculum had been achieved.

REMOVAL OF TIME AS A CREDIT REQUIREMENT

Student perceptions regarding the removal of time as a credit requirement were collected through the administration of an annual questionnaire which measured their attitudes and perceptions. Teachers and administrators were also polled with questionnaires. A sample of each of the three groups was interviewed annually to help clarify the data collected. For the summative analysis, the key concepts of *use of a stop mechanism*, *provision of flexible entrance to the next course level* and *course learning pace compatible with student ability* were extracted from the student questionnaire and analyzed. Descriptive statistics for these concepts were also extracted from teacher and administrator questionnaires. Interview data from the five Formative Evaluation Reports were also reviewed as were field notes based on school observation and other relevant documentation.

The Department-based Model allowed students to stop and solve their problems as they were encountered and provided flexible course entrance. Variable learning rates were evident in the program but students taking longer than a semester to complete a course were treated on an individual case basis rather than by department policy.

The Parallel Core Program Model also allowed students to solve problems as they occurred in their learning. The program did not provide flexible course entrance because there was no continuous progress option available to students. Variable learning rates were evident within the individual course unit as students determined their own schedules based on perceived learning needs but students progressed from unit to unit together.

The School-wide Model also provided a stop mechanism for students encountering difficulty. Evidence supported teacher and administrator perceptions that learning rate variability and flexible course entrance were in effect, although student perceptions were affected negatively to an extent by administrative policies about time use which were tightened near the end of the project. Additional time to study this program would have allowed these policies to be assimilated and thereby would have clarified program perceptions.

All three models were determined to be functioning outside of the traditional Carnegie Unit, allowing students more or less time than the 125 hours as their learning needs dictated. The Department-based and School-wide Models provided for continuous and individual progress from unit to unit and from course to course. The Parallel Core Program Model provided for variable learning rates within the unit but did not adopt continuous progress as a delivery system focussing instead on enrichment. It was concluded that all three models had removed time as a requirement in awarding credit, although the Parallel Core Program's more structured approach to time had not been anticipated.

COMPETENCY AS THE BASIS FOR AWARDING CREDIT

Perceptions regarding competency as the basis for awarding credit rather than time spent in a course were treated in a manner similar to those outlined above. The key concepts included *use of tests at the unit level, demonstration of competency at the unit level*

before proceeding, and ***advancement to the next course based on student competency, not time spent***. These were analyzed along with relevant interview data, field notes and documentation.

The Department-based Model tested students at the unit level and ensured that students demonstrated competency in their course material before progressing to the next course level. Students differed in their opinion from teachers and administrators, however, as to whether students had to demonstrate competency at the unit level. There appeared to be a relationship between the nature of course content and whether competency was required for each unit; in particular, non-sequential material was presented in such a way that students could do make-up units at the end of the course and, in that case, their advancement to the next unit was not based on demonstrated competency. There did not appear to be a policy covering progression from unit to unit, rather it was determined by the individual teacher based on the nature of the course material.

The Parallel Core Program Model also tested students at the unit level and ongoing evaluation was stressed. Individual advancement based on competency at both the unit and course levels was not perceived to be available by either students or teachers, while administrators were more positive in their perceptions regarding advancement at the unit level. Competency issues were dealt with in a variety of ways other than individual continuous progress including the following: one-on-one student interaction with teachers was increased due to timetable flexibility in the program; initial student selection procedures identified independent learners for the program; curricular materials addressed learning style differences; and a program policy for dealing with unsuccessful students moved them, once remediation had been attempted, to more appropriate courses or out of the program altogether. In these ways student competency levels were addressed by the Parallel Core Program Model although individual advancement in either unit or course was not encouraged.

The School-wide Model tested students at the unit level and required competency to be demonstrated at both the unit and the course levels before students could advance. Students, teachers and administrators agreed in their perceptions about the success of this model in making competency the basis of awarding credit.

All three models addressed competency issues as they related to non-traditional use of time. The School-wide Model was the most successful in terms of making competency the basis for awarding credit according to Project ABC criteria. The Department-based Model also made competency the basis for credit although some non-sequential material was handled differently at the unit level. The Parallel Core Program Model made competency the criterion for awarding credit within the traditional parameters of the semester or school year but did not encourage individual advancement at either unit or course levels. Appropriate student selection for the program and a variety of instructional techniques helped to ensure that students would succeed within allotted time limits. It was concluded that competency had been made the basis for awarding credit in the School-wide and Department-based Models but that individual advancement based on demonstrated competency was not encouraged in the Parallel Core Program Model.

CONSIDERATIONS FOR PROVINCIAL APPLICATION

In order for Alberta Education to consider province-wide application of Project ABC-type alternatives, a policy Delphi study was conducted in 1987 to poll participants' views on project outcomes. Several identified project benefits were supported by interview data. In particular, students appreciated the opportunity to learn at their own rate and to work on a one-on-one basis with their teachers. Teachers and administrators also felt that students assumed more responsibility for their learning and developed confidence and independence. Teachers gained from the project as well in terms of increased freedom to experiment, greater awareness of different teaching styles and greater satis-

faction. Alberta Education consultants believed that Project ABC teachers had grown professionally from the experience. The greatest benefit to project schools to emerge was the promotion of an atmosphere of cooperation between staff and students. Schools also gained materially from their involvement in the project through increased funding which provided support for paraprofessionals and improved library resources. They also benefited from additional computers, learning materials and instructional equipment.

The most serious disadvantages or perceived problems emerging from the project were rated lower by Delphi participants than perceived benefits, thereby highlighting the overall positive perception of the project. For students, the main disadvantage was the ease with which they could fall behind in their work. Teachers and administrators also felt that students sometimes lacked understanding about program demands and how to handle them. For teachers, perceived disadvantages included the added stress and potential burnout associated with being part of an alternative project, increased workload, and frustration with unclear goals, particularly in the School-wide Model. Problem areas identified for schools included increased resource needs, more complex resource management and the need for strong leadership.

Key components for an alternative to time-credit program were identified, the most critical of which included:

1. Specially selected teachers who demonstrate the characteristics of openness to change, industry, receptiveness, energy, and flexibility, who are team players and who support the alternative philosophy.
2. Support from the local board, the community and government.
3. Adequate lead time for curriculum development and time for ongoing revision.
4. Decisive leadership.
5. A sound educational rationale coupled with adequate staff development and new teacher orientation.
6. Effective student monitoring, tracking and record keeping systems.

7. Clear and consistent policies, expectations and consequences for students.
8. A school-wide philosophy and total school staff involvement in and commitment to the alternative program.
9. Adequate clerical and paraprofessional support.
10. Adequate ongoing teacher release time for planning and coordination.
11. Sufficient funding to initiate and maintain the program.
12. Adequate program size to maintain one-on-one interaction between teachers and students.
13. Timetable flexibility.
14. Good liaison with feeder schools.
15. Good communication with parents.

A final critical component was not identified in the policy Delphi but emerged from the perceptions of Alberta Education consultants and final-year interviews with students, teachers and administrators. This was the need for a flexible physical plant with a variety of instructional spaces available for large groups, seminars, and individual study as well as traditional classroom areas. In the two larger Project ABC programs, library space was enlarged or reorganized to meet the demands of individualized instruction and traditional classroom spaces were converted into test centres.

It was concluded that Project ABC-type programs could successfully be implemented in other schools and school jurisdictions. Based on the fact that three different models developed in this project and that similar diversity was experienced in the Eight-Year Study, it was also concluded that models should develop which were appropriate to school-based needs. The policy Delphi helped to pinpoint a number of critical considerations for any school attempting a similar program, the most important of which was teacher selection.

BUDGET CONSIDERATIONS

The different nature of a Project ABC-type program means that some budget considerations must be addressed before such a program can be developed.

The first area is related to resources. Instructional materials need to be expanded to include a broader range and number of materials to meet the demands of an individualized program. Tightened security and increased maintenance costs are also required. Information processing facilities such as computers, word processors, photocopiers, and of course paper are at a premium in this kind of a program.

The second area where budget is affected relates to staff costs. There is an increased requirement for paraprofessional and clerical support in this type of program to assist with student tracking, the production and organization of materials, test supervision and lab coordination. Professional development costs are affected by the need for staff training in the philosophical underpinnings of an individualized approach and in specific curriculum areas. New teacher orientation is an ongoing cost. Release time must also be provided for initial curriculum development. There are minor ongoing costs for annual release time for revision and planning.

It was concluded that in order to manage the more complex resource requirements of a Project ABC-type program, a decentralized budgeting model which includes staff resources is appropriate.

Evaluator Perceptions

Evaluating Project ABC over a five-year period was a unique research experience. As the models grew, the process became more complex, more engrossing, more encompassing. The further the

evaluation progressed, the greater the challenge became. As the three models evolved, there was a greater and greater demand for responsive evaluation techniques which could address changing needs. The original evaluation design was expanded to include extensive interviewing and on-site observation. The final-year policy Delphi was able to address issues which had not even been identified five years before.

If the study process expanded far beyond initial expectations so too did study rewards. The formative nature of the evaluation process allowed for immediate feedback into planning. School administrators were kept apprised of annual study findings as they occurred and these then helped to guide goal-setting activities for the subsequent term or year. The Formative Evaluation Reports came to be eagerly anticipated as project goals grew closer. The evaluation process worked.

The schools, too, found themselves challenged beyond initial expectations and their rewards increased as well. As each issue was resolved, three or four others would present themselves. Successful group decision-making processes proved to be critical to model development. As staff members discussed philosophical issues and methodological approaches, they were forging new visions for what a high school could be. Each of those visions was unique.

Of the three models, the most traditional one was probably the Department-based Model at William Aberhart High School. And yet for Business Education instruction, it was a radical departure. The use of a real-life office environment had a profound effect on instructional processes and student expectations. Collegiality among staff members flourished. In a sense, however, the program did not provide an alternative; it was the only way Business Education was offered at that school. At a department level, it appeared that providing a choice in delivery systems was not feasible. Individual learning styles were not addressed, because

although materials were organized into unit packs, they presented instruction in one format only, namely "Read and Do." Students with special reading or language needs were unlikely to succeed. Subject areas such as Law lost some of the learning that occurs in a spontaneous class discussion. But for the most part, the skills-oriented Business Education courses transferred nicely to an individualized approach and students gained motivation through the freedom afforded them to work at their own rate. The model provided a viable learning alternative to traditional Business Education instruction. Too soon, however, the program had to face the harsh reality of a factor beyond its control - declining enrolment. At project end, the program was jeopardized by pupil-teacher ratios falling below the level at which the program could be maintained and its future was uncertain.

The Parallel Core Program Model placed the greatest strains on the evaluation process. Had a goal-free evaluation model been developed five years ago, problems might have been avoided but a definite set of goals had been developed and therefore had to be measured. What occurred was that as the program grew and prospered, it charted a different course from the project mainstream. Continuous progress did not develop; instead, staff focussed on enrichment and learning styles. The tools developed to measure continuous progress were not appropriate for gauging what was actually happening at the school. Nevertheless, program excellence was evident and participant satisfaction was high, significantly higher in fact, than that of traditional students in the same school. The contextual component built into the evaluation process provided an opportunity to react to developing study needs and thus it was possible to measure actual student use of time during the school day. An increasing focus on interview data as the study progressed also permitted an exploration of perceptions not measured by study instruments. In the end, it was clear that the program had broken the Carnegie Unit but had set up different parameters from the other two programs to regulate student movement through course material. The unquestionable

quality of the resulting program led to the conclusion that Project ABC-type programs were alternatives which were not necessarily appropriate for every student but which were very appropriate for independent learners. The program also demonstrated that it could co-exist successfully with its traditional counterpart and dispelled any notion of elitism by its success with non-academic students as well as high achievers.

The School-wide Model took a long time to incubate. However, its slow generation proved to be valuable in the end because many constructive lessons were learned about implementing a Project ABC-type program. As Grade 10 shakily got off the ground in the third year of the project, there was more than one observer who questioned the possibility of ultimate success in terms of Project ABC goals. However, all the questioning, debating and self-analysis paid off in the long run, not in small part due to an administrative team who simply would not give up the vision. In the end, the pieces fell into place, and while certainly not yet perfect, Ernest Manning High School is now providing an alternative to time-credit where competency, not time spent, is the critical factor.

Conclusions

What follows is a list of conclusions about Project ABC which have been drawn based on data collected over the five-year period 1982-1987.

1. Achievement levels of Project ABC students were as good as student achievement levels in both local and provincial programs.

2. The Alberta Curriculum was adhered to in all three Project ABC schools. In the Parallel Core Program Model, provincial requirements were exceeded.

3. The three Project ABC schools successfully provided alternatives to the Carnegie Unit.

4. Project ABC demonstrated that competency rather than time spent in a course can become the basis for awarding credit.

5. Personalized instruction and continuous progress are viable educational alternatives and should no longer be considered experimental.

6. Program delivery can be successfully individualized, although the nature of the subject matter will have an impact on the degree to which individualization can occur.

7. Models for a Project ABC-type program should emerge from the nature of the individual school and its community.

8. This type of program is particularly appropriate for students who are independent learners.

9. This type of program is best implemented by teachers who support and practise the project philosophy.

10. This type of program requires a clear program vision, commitment of the total school staff and strong administrative leadership.

11. This type of program requires more complex financial management than a traditional program and involves both start-up and maintenance costs which are different from traditional resource allocations in order to support resource needs, professional development and orientation, teacher release time, and paraprofessional and clerical assistance.

12. A flexible physical plant design enhances the implementation of this type of program but it is not essential.

Recommendations for the Calgary Board of Education

Based on data collected in Project ABC, it is recommended to the Calgary Board of Education that:

1. Contingent upon Alberta Education approval, the three Project ABC programs be granted exemption from the Carnegie Unit.

2. Contingent upon Alberta Education approval, opportunity be provided for other Calgary Board of Education schools to offer Project ABC-type programs which are also granted exemption from the Carnegie Unit.

3. The School-wide Model achievement levels be evaluated for two additional years.

4. Consideration be given to exploring different ways of allocating resources to Project ABC-type schools.

5. Consideration be given to the teacher characteristics identified in this study as being critical to program success when assigning staff to alternative Project ABC-type programs.

6. Consideration be given to student learning styles and to matching them with appropriate program delivery when enrolling students in Project ABC-type programs.

7. Flexible instructional spaces be considered in the construction of new schools and the renovation of existing ones.

8. Project ABC teachers and administrators be formally commended for their dedication and commitment in making these programs successful and that their successes be celebrated.

Recommendations for Alberta Education

Based on data collected in Project ABC, it is recommended to Alberta Education that:

1. Contingent upon Calgary Board of Education approval, the three Project ABC programs be granted exemption from the Carnegie Unit.

2. Opportunity be provided for Alberta school jurisdictions to offer Project ABC-type programs which are also granted exemption from the Carnegie Unit.

3. Incentives be provided for school authorities embarking on a Project ABC-type program to support model development.

4. A clearing house for individualized curriculum materials be established.

5. Consideration be given to more frequent administrations of Grade 12 Diploma Examinations during the year to accommodate the needs of students in continuous progress programs.

6. A follow-up study be conducted to determine the success of Project ABC students in post-secondary programs or work environments.

Implications

During the five-year period of Project ABC, it became apparent that a project of this magnitude would have far-reaching and long-term implications which would extend beyond 1987 and into the lives of current and future students, teachers and administrators in Alberta. Some of the implications are discussed below.

PROPOSED ALBERTA SCHOOL ACT

The proposed Alberta School Act is based on five principles: access to quality education; equity; flexibility; responsiveness; and accountability. Of particular relevance to Project ABC, and other programs which provide an alternative to time-credit, is the concept of flexibility. These programs address students' needs for flexible time use as well as supporting the philosophies of personalized education and advancement based on competency. The proposed legislation leaves the door open for any school board to offer alternative programs such as those described here.

EDUCATIONAL POLICY

The Secondary Education in Alberta Policy Statement which was formally released in 1985 by the Minister of Education and the Premier of Alberta set a new direction for Alberta's high schools. Within the policy were several principles which related directly to the goals of Project ABC. These included the following:

Principle #1 The secondary school, in cooperation with other agencies in society, must assist each student to become a competent, confident and responsible individual. However, the secondary school must assume primary responsibility for the intellectual development of each student and for ***fostering the desire for lifelong, self-directed learning***.

Principle #2 The development and implementation of the instructional program must take into account the following considerations:

- ***the nature and needs of the learner***
- the nature and needs of a changing society
- the nature of knowledge in each subject area
- ***the learning environment***[1]

Among the guidelines set for senior high programs in the document was one which acknowledged the potential already being explored by Project ABC, specifically:

> While the content and objectives of courses are set, the secondary school program and administrators should encourage teachers to use appropriate teaching strategies and materials to accommodate individual learning styles and needs. Opportunities for continuous learning, individualized instruction, and other strategies ... should be expanded at both the junior and senior high school levels.[2]

By 1987, in a document entitled ***Proposed Directions for Senior School Programs and Graduation Requirements***, specific mention was made of alternatives to the Carnegie Unit and school boards were invited to explore this alternative provided that all students had access to at least minimal instructional time to realize course expectations.

Project ABC is in the forefront of alternatives to the Carnegie Unit. Now that the project has been completed and the results have been reported, it may have an impact on Alberta's high schools. Alternative use of time in schools and alternative delivery systems have created positive learning environments. More schools may want to explore them.

TEACHING AND LEARNING STYLES

There are many individuals whose lives have been changed as a result of their involvement in Project ABC. After spending up to five years on revising their methodologies, trying new approaches, being open to change, becoming familiar with different learning

styles, fostering student independence and changing the traditional teaching approach, there are teachers whose teaching styles have been permanently altered as a result of teaching in project schools. They have often been heard to say, "I could never go back to the old style of teaching." Whether they have an option remains to be seen, but even in a closed classroom situation they may find a lot of their skills transferable and their teaching enriched as a result. Further, the leadership skills which many have developed as a result of meeting the challenges of Project ABC may well encourage them to pursue career paths they might not have otherwise.

Undoubtedly, there has been an impact on students as well. They have had their learning style needs addressed in a number of innovative ways. Some have experienced success through the provision of additional time. Others have been challenged by enrichment activities they would not have had time for otherwise. Still others have been able to concentrate on areas of weakness while moving more quickly through areas of strength. Many have learned time management skills and have had closer, more satisfying relationships with their teachers.

Administrators met the challenge of finding innovative solutions to staff development needs, budget constraints, student tracking and record keeping, and school leadership problems.

ADDITIONAL RESEARCH

Several areas for further research emerge from Project ABC. The substantial documentation resulting from this study includes five Formative Evaluation Reports and the Delphi Study, each of which is based on significant amounts of quantitative and qualitative data. Along with this Summative Evaluation Report, they form a rich source of information for further analysis.

Other research which should be conducted includes the continued tracking of student achievement at the 30-level in the School-wide Model for two additional years as the Grade 12 program was only operational in the final year of the project. In addition, Project ABC students should be tracked in their post-secondary or career situations to determine the long-term effects of personalized instruction and non-traditional use of time. Fifty years ago, the Eight-Year Study tracked high school students throughout their college years but did not attempt to follow up those graduates who went immediately into the work force although the need to do so was acknowledged. Perhaps this time such a follow-up study could be implemented, supported by foundation grants as was the case in the Eight-Year Study.

Finally, the impact of the project should be tracked in terms of teacher development over the next five years. This study has identified the profound effect that Project ABC has had on teaching styles but project teachers' future development in terms of leadership, risk taking ability, creativity and job satisfaction is worth pursuing further.

CONCLUDING COMMENTS

Project ABC was a successful adventure in learning. For teachers who watched their students turn into independent, self-directed learners, for administrators who watched their teachers develop unforeseen strengths and skills, and for the project director and the project evaluator who watched the three schools address and meet the challenges they had set for themselves, the journey was worth the effort.

High school traditions which have linked time and credit since early in the century were confronted and overturned. Project ABC proved that there are other ways to manage time in high schools and other ways to award credit. Satisfaction rose when students

had more control over how they spent their time in school. They appreciated working at their own pace. Satisfaction rose when teachers could address individual student needs as they occurred. They appreciated working outside the bounds of a rigid timetable. Satisfaction rose when administrators did not have to fail students simply because they needed more time. They appreciated the improved school climate which resulted from increased cooperation between staff and students.

Project ABC is no longer an experiment. It is an alternative approach to high school which acknowledges individual learning needs, individual learning rates and individual learning styles. What better way to approach the end of the century, but with a new vision about how high schools can work.

NOTES

Chapter 1

1. a) Peter J. Baker, ***The Carnegie Unit: Pros, Cons and Alternatives***, Planning and Research Branch, Alberta Education, January, 1980, p. 1.

b) Peter J. Baker, ***An Analysis of the Carnegie Unit, The Existing Variations Within Secondary Schools of Alberta and the Feasibility of Challenge Tests***, Planning and Research Branch, Alberta Education, December 1980.

2. ***Dysfunctional Youth in Senior High School***, Task Force, Calgary Board of Education, c. 1979, p. 3.

3. Ibid., Ian Dallas, Assistant Principal, Bowness High School, Correspondence, June 12, 1979.

4. Ibid. (No page numbers.)

5. Dr. Jim MacLellan, former Associate Superintendent of Instructional Services, Calgary Board of Education, Personal Interview, July 15, 1987.

6. ***Project ABC: Advancement Based on Competency: An Alternative to Time for Credit.*** A Request to Alberta Education from Calgary Board of Education, c. 1980, p. 6.

7. Ibid., pp. 6-7.

8. Gail V. Barrington, ***Project ABC: Advancement Based on Competency, Formative Evaluation Report, Year 1***, Calgary Board of Education, October 1983, p. 3.

Chapter 2

1. Julia Hall and Paul Gerber, "The Awarding of Carnegie Units to Learning Disabled High School Students: A Policy Study," Educational Evaluation and Policy Analysis, Fall - Vol. 7 No. 3, 1985, pp. 229-235.

2. Peter J. Baker, *An Analysis of the Carnegie Unit, The Existing Variations Within Secondary Schools of Alberta and the Feasibility of Challenge Tests*, Planning and Research Branch, Alberta Education, December 1980.

3. Peter J. Baker. *The Carnegie Unit: Pros, Cons and Alternatives*, Planning and Research Branch, Alberta Education, January, 1980, p. 1.

4. Ibid., pp. 2-3.

5. Ibid., pp. 3-5.

6. Hall and Gerber, loc. cit.

7. Ralph W. Tyler, *Perspectives on American Education: Reflections on the Past, Challenges for the Future*, Chicago: Science Research Associates, Inc., 1976(a), p. 38.

8. Wilford M. Aikin, *The Story of the Eight-Year Study with Conclusions and Recommendations*, Adventures in Education, Volume 1, New York: Harper and Brothers, 1942, p. 116.

9. Ibid., p. 144.

10. Ibid., p. 141.

11. Ibid., pp. 111-112.

12. Ibid., p. 113.

13. Ibid., p. 150.

14. Ibid., p. 115.

15. Ibid., p. 117.

16. Ibid., p. 118.

17. Ibid., p. 124.

18. Ralph W. Tyler (ed.), *Prospects for Research and Development in Education*, Berkeley: McCutchan Publishing Corporation, 1976(b), p. 27.

19. Tyler, 1976(a), op. cit., p. 41.

20. Loc. cit.

21. Egon G. Guba and Yvonna S. Lincoln, *Effective Evaluation: Improving Usefulness of Evaluation Results Through Rsponsive and Naturalistic Approaches*, San Francisco: Jossey-Bass, 1981, p.

22. Tyler, 1976(b), op. cit., pp. 27-28.

23. Tyler, 1976(a), op. cit., pp. 32-33.

24. Ontario Teachers' Federation, Case Studies in Continuous Progress, The Continuous Progress Committee, Toronto: Ontario Teachers' Federation, 1972.

25. Ibid., pp. v-vi.

26. J. Lloyd Trump, *A School for Everyone*, NASSP, Reston, VA, 1977, p. 274.

27. Ibid., p. 269.

28. Bishop Carroll High School: A Profile, Calgary Separate School Board, Undated.

29. William M. Alexander, J. Galen Saylor and Emmett L. Williams, *The High School Today and Tomorrow*, New York: Holt, Rinehart and Winston, Inc., 1971, p. 277.

30. Ibid., p. 335.

31. J. Lloyd Trump and Delmas F. Miller, *Secondary School Curriculum Improvement: Meeting Challenges of the Times*, Third edition, Boston: Allyn and Bacon, Inc., 1979.

32. Ibid., p. 387.

Chapter 3

1. Gail V. Barrington, *Project ABC: Advancement Based on Competency, Formative Evaluation Report, Year 1*, Calgary Board of Education, October 1983, pp. 3-4.

2. Earl R. Babbie, *Survey Research Methods*, California: Woodsworth, 1973, pp. 63-65.

3. Gail V. Barrington, *Project ABC: Advancement Based on Competency, Formative Evaluation Report, Year 3*, Calgary Board of Education, November 1985, pp. 3-5.

4. Gail V. Barrington, *The Impact of Environmental Forces on Alberta Community Colleges, 1980-1990*, University of Alberta, 1981, pp. 92-97. Also see Krippendorf (1969) and Holsti (1969).

5. Nancy J. Helledie and Gail V. Barrington, *Project ABC: Advancement Based on Competency - Delphi Study*, Calgary Board of Education, 1987.

6. All data have been interpreted per variable (stop mechanism, learning rate comparable with ability, flexible entrance, test use at the unit level, demonstrated competency before proceeding and advancement based on competency) in order to determine information about each one independently. Therefore, a univariate analysis of variance was used for summative statistical analysis.

7. Egon G. Guba and Yvonna S. Lincoln, *Effective Evaluation: Improving the Usefulness of Evaluation Results through Responsive and Naturalistic Approaches*, San Francisco: Jossey-Bass, 1981, p. 104.

Chapter 4

1. G. E. Elhard, Principal, William Aberhart High School Correspondence to F. G. Anderson, Superintendent, North Area, Calgary Board of Education, 1974.

2. Calgary Board of Education. *Project ABC: Advancement Based on Competency - An Alternative to Time for Credit*. A Request to Alberta Education, Undated, c.1980, pp. 42-46.

3. Ibid., pp. 49-50.

4. Ibid., p. 52.

5. Ibid., p. 54.

6. Ibid., p. 55.

7. Ibid., p. 53.

8. Loc. cit.

9. Ibid., p. 56.

10. *Everything You Wanted to Know About PEP*, John G. Diefenbaker High School, pamphlet, undated, p. 4.

11. Gail V. Barrington, *Project ABC: Advancement Based on Competency, Formative Evaluation Report*, Calgary Board of Education, *Year 2*, October 1984, pp. 206 and 212.
Year 3, November 1985, pp. 345-346, 350 and 352.
Year 4, October 1986, pp. 364-365, 369 and 371.
Year 5, October 1987, pp. 136-137, 140 and 142.

12. Gail V. Barrington, *Project ABC: Advancement Based on Competency, Formative Evaluation Report, Year 3*, Calgary Board of Education, November 1985, p. 90.

13. John G. Diefenbaker, op. cit., p. 2.

14. Calgary Board of Education, op. cit., p. 76.

15. Ibid., p. 80.

16. Loc. cit.

17. Ibid., p. 81.

18. Ibid., p. 86.

19. Ernest Manning High School, *Personalized and Continuous Progress (P.A.C.E.)*, Document, May 1986, p. 1.

20. Gail V. Barrington, *Project ABC: Advancement Based on Competency, Formative Evaluation Report, Year 5*, Calgary Board of Education, October 1986, pp. 251-252.

21. Nancy J. Helledie and Gail V. Barrington, *Project ABC: Advancement Based on Competency, Delphi Study*, Calgary Board of Education, 1987, p. 6.

Chapter 5

1. Nancy J. Helledie and Gail V. Barrington, *Project ABC: Advancement Based on Competency - Delphi Study*, Calgary Board of Education, 1987, pp. 8-9.

2. Helledie and Barrington, op. cit., p. 8.

3. See *Delphi Study* and *Formative Evaluation Report, Year 5*.

4. Thanks to Al Kahanoff, Project Director, Project ABC, for input to this section on budget considerations.

Chapter 6

1. Government of Alberta, *Secondary Education in Alberta - Policy Statement*, June 1985, pp. 7-8. (Italics added.)

2. Ibid., p. 15.

REFERENCES

Aikin, Wilford M. *The Story of the Eight-Year Study with Conclusions and Recommendations*. Adventures in Education, Vol. 1. New York: Harper and Brothers, 1942.

Alberta Education. *Regulations and Guidelines Pertaining to the Operation of Alberta Junior and Senior High Schools*. Edmonton, 1981.

Alberta Education. *Proposed Directions for Senior High School Programs and Graduation Requirements*. Edmonton, June 1987.

Alexander, William M., Saylor, and Williams. *The High School Today and Tomorrow*. New York: Holt, Rinehart and Winston, Inc., 1971.

Babbie, Earl R. *Survey Research Methods*. California: Woodsworth, 1973.

Baker, Peter J. *An Analysis of the Carnegie Unit, The Existing Variations Within Secondary Schools of Alberta and the Feasibility of Challenge Tests*. Edmonton: Planning and Research Branch, Alberta Education, December 1980.

Baker, Peter J. *The Carnegie Unit: Pros, Cons, and Alternatives*. Edmonton: Planning and Research Branch, Alberta Education, January 1980.

Barrington, Gail Vallance. *The Impact of Environmental Forces on Alberta Community Colleges 1980-1990*. Unpublished doctoral thesis, Department of Educational Administration, The University of Alberta, Edmonton, 1981.

Barrington, Gail V. *Project ABC: Advancement Based on Competency, Formative Evaluation Report, Year 1*. Calgary Board of Education, October 1983.

Barrington, Gail V. *Project ABC: Advancement Based on Competency, Formative Evaluation Report, Year 2*. Calgary Board of Education, October 1984.

Barrington, Gail V. *Project ABC: Advancement Based on Competency, Formative Evaluation Report, Year 3*. Calgary Board of Education, November 1985.

Barrington, Gail V. *Project ABC: Advancement Based on Competency, Formative Evaluation Report, Year 4*. Calgary Board of Education, October 1986.

Barrington, Gail V. and Helledie, Nancy J. *Project ABC: Advancement Based on Competency, Formative Evaluation Report, Year 5*. Calgary Board of Education, October 1987.

Bent, Rudyard K. et. al. *Principles of Secondary Education* - Sixth Edition. New York: McGraw Hill Book Co., 1970.

Calgary Board of Education. *Dysfunctional Youth in Senior High School*. Task Force, c. 1979.

Calgary Board of Education. *Project ABC: Advancement Based on Competency - An Alternative to Time for Credit*. A Request to Alberta Education. Undated, c. 1980.

Calgary Separate School Board. *Bishop Carroll High School: A Profile*. Undated.

Elhard, G. E., Principal, William Aberhart High School correspondence to F. G. Anderson, Superintendent, North Area. Calgary Board of Education, 1974.

Ernest Manning High School. *Personalized and Continuous Progress (P.A.C.E.)*, Document. May, 1986.

Government of Alberta. *1987 Bill 59, School Act*. The Legislative Assembly of Alberta, Second Session, 21st Legislature, 36 Elizabeth II.

Government of Alberta. *Secondary Education in Alberta - Policy Statement*. June 1985.

Guba, Egon G. and Lincoln, Yvonna S. *Effective Evaluation: Improving the Usefulness of Evaluation Results Through Responsive and Naturalistic Approaches*. San Francisco: Jossey-Bass, 1981.

Hall, Julia and Gerber, Paul. "The Awarding of Carnegie Units to Learning Disabled High School Students: A Policy Study", *Educational Evaluation and Policy Analysis*. Fall, Vol. 7, No. 3, 1985, pp. 229-235.

Helledie, Nancy J. and Barrington, Gail V. *Project ABC: Advancement Based on Competency - Delphi Study*. Calgary Board of Education, 1987.

Holsti, Ole R. "Introduction to Aspects of Inference from Content Data", *The Analysis of Communication Content: Developments in Scientific Theories and Computer Techniques*. New York: John Wiley and Sons, 1969, pp. 109-122.

John G. Diefenbaker High School. *Everything You Wanted to Know About PEP*. Pamphlet. Undated.

Krippendof, Klaus. "Introduction to Theories and Analytical Constructs", *The Analysis of Communication Content: Developments in Scientific Theories and Computer Techniques*. New York: John Wiley and Sons, 1969, pp. 3-16.

Mather, Weslyn. "J. Percy Page Composite High School Advisor Program: A Student Approach", *The Alberta Counsellor*. Edmonton: The Alberta Teachers' Association. Vol. 14, No. 1, Fall, 1985.

Ontario Teachers' Federation. *Case Studies in Continuous Progress*. The Continuous Progress Committee. Toronto: Ontario Teachers' Federation, 1972.

Prather, Sharon. Consultant, Business Education, Calgary Regional Office, personal communication to Dr. G. Bevan, Director, Curriculum Branch, Edmonton Regional Office. October 3, 1984.

Til, William Van (ed). *Issues in Secondary Education*, National Society for the Study of Education. Chicago: University of Chicago Press, 1976.

Trump, J. Lloyd. *A School for Everyone*. Reston, VA: NASSP, 1977.

Trump, J. Lloyd and Miller, Delmas F. *Secondary School Curriculum Improvement: Meeting Challenges of the Times* - Third Edition. Boston: Allyn and Bacon, Inc., 1979.

Tyler, Ralph W. *Perspectives on American Education: Reflections on the Past Challenges for the Future*. Chicago: Science Research Associates, Inc., 1976.

Tyler, Ralph W. (ed.) *Prospects for Research and Development in Education*. Berkeley, CA: McCutchan Publishing, 1976.

APPENDIX 1

Statistical Findings

Department-based Model

Comments

STUDENT ACHIEVEMENT

To respond to the question ***What changes occurred in the achievement of project students during the course of the project***, three courses, Typing 30, Accounting 30 and Law 30, were subjected to univariate analysis of variance with year as a factor to determine change over time within the project school. The program employed was the SPSS ONEWAY with ***post hoc*** testing.

Highlights of the statistical analysis indicate that Accounting 30 was the only course to show any significant change over time. An $F\ (3,\ 41) = 3.52$, $p = 0.02$ was identified in the analysis of variance for Accounting 30 and the Scheffé procedure (***post hoc*** ONEWAY contrast) yielded a significant difference between the grades in 1983-1984 and 1985-1986. There was a significant decrease in the mean from 72.4 to 46.7. The mean scores were significantly different at the .05 level. The mean rose again in 1986-1987, but not significantly.

To respond to the question ***How did achievement levels of project students compare with those of non-project students within the system and within the province***, the variables or courses were then subjected to univariate analysis of variance with student population (school, city and province) as a factor to determine significant differences between groups throughout Project ABC.

The program employed was the SPSS-X ONEWAY with ***post hoc*** testing. Caution should be taken in placing too much emphasis on these statistical data. Due to the large difference in the size of the student populations being contrasted, the assumption of homogeneity of variance cannot be met. Therefore, the significantly different values may be inflated. Highlights of the statistical analysis indicate that students' grades in Typing 30 in 1984-1985 were significantly lower than the city and the province, students' grades in Law 30 in 1984-1985 were significantly higher than those of the controls, and students' grades in Accounting 30 in 1985-1986 were significantly lower than those of the controls.

An $F\ (2,\ 3793) = 4.92$, $p = 0.01$, was identified in the analysis of variance for Typing 30 in 1984-1985 and the Scheffé procedure yielded a significant difference between achievement levels in the school and in the control groups. The mean scores were significantly different at the .05 level.

An $F\ (2,\ 2938) = 3.83$, $p = 0.02$, was identified in the analysis of variance for Law 30 in 1985-1986 and the Scheffé procedure yielded a significant difference between achievement levels in the school

and in the control groups. The mean scores were significantly different at the .05 level.

An F (2, 2937) = 11.06, p = <.001, was identified in the analysis of variance for Accounting 30 in 1985-1986 and the Scheffé procedure yielded a significant difference between achievement levels in the school and in the control groups. The mean scores were significantly different at the .05 level.

TIME REMOVED AS A CREDIT REQUIREMENT

The variables ***stop mechanism***, ***learning rate compatible with ability***, and ***flexible entrance to the next course level*** extracted from the student questionnaire were subjected to univariate analysis of variance with year as a factor to determine change over time. The program employed was the SPSS ONEWAY with ***post hoc*** testing.

Highlights of the statistical analysis indicate that with a project success rate set at a mean score of 3.5, students perceived successful goal attainment in terms of the presence of a ***stop mechanism*** and the provision of ***flexible entrance to the next course level***. They did not, however, perceive a successful level of attainment in terms of providing for ***compatibility between learning rate and ability***. Although there was some growth in this area over the course of the project, it did not reach satisfactory levels.

Descriptive statistics for teacher and administrator perceptions of these variables, extracted from their respectives questionnaires were also included, although no analysis of variance was conducted due to small sample size.

Interview data referred to in the main text is reported in the five Formative Evaluation Reports.

COMPETENCY THE BASIS FOR AWARDING CREDIT

The variables ***test use at the unit level***, ***demonstrated competency at the unit level before proceeding*** and ***advancement based on competency, not time*** on the student questionnaire were also subjected to a univariant analysis of variance with year as a factor to determine change over time. The program employed was the SPSS ONEWAY with post hoc testing.

Highlights of the statistical analysis indicate that with a project success rate set at a mean score of 3.5, students perceived successful goal attainment in terms of ***test use at the unit level*** and the provision of the opportunity for ***advancement based on competency to the next course level***. They did not perceive a successful level of attainment in terms of requiring students to ***demonstrate competency before proceeding to the next unit***. However, significant growth was achieved in this area. An F (3, 471) =

3.48, p = 0.02 was identified in the analysis of variance and the Scheffé procedure (*post hoc* ONEWAY contrast) yielded significant differences between 1984 and 1985. There was a significant increase in the mean from 1984 to 1985. While the variable then declined in 1986, it rose even further in 1987 to a mean of 3.2.

Descriptive statistics for teacher and administrator perceptions of these variables are also included although no analysis of variance was conducted due to small sample size.

Interview data referred to in the main text is reported in the five Formative Evaluation Reports.

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT

DEPARTMENT-BASED MODEL

1984-1987

COURSE		1984	1985	1986	1987
1. TYPING 30	Mean	63.2	56.7	62.8	-*
	s.d.	12.9	16.5	12.3	-
	N	18	15	16	-
2. ACCOUNTING 30**	Mean	72.4	59.0	46.7	61.4
	s.d.	10.0	23.6	27.4	20.0
	N	17	9	9	7
3. LAW 30	Mean	60.0	73.5	65.3	70.2
	s.d.	18.1	14.8	11.6	12.3
	N	22	16	15	5

* Student sample less than 5; therefore, analysis is not valid.

** An $F\ (3, 41) = 3.52$, $p = 0.02$ with significant difference between 1984 and 1986.

ANALYSIS OF VARIANCE FOR STUDENT ACHIEVEMENT

DEPARTMENT-BASED MODEL

1984-1987

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	TYPING 30	Between Groups	486.92	3	162.31		
		Within Groups	8984.83	48	187.18	0.87	0.46
		Total	9471.75	51			
2.	ACCOUNTING 30	Between Groups	4020.24	3	1340.08		
		Within Groups	14457.60	38	380.46	3.52	0.02
		Total	18477.83	41			
3.	LAW 30	Between Groups	1776.29	3	592.10		
		Within Groups	12686.69	54	234.94	2.52	0.07
		Total	14462.98	57			

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, TYPING 30,

DEPARTMENT-BASED MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1984-1987

	TYPING 30		1984	1985*	1986	1987
1.	Department-based Model	Mean	63.2	56.7	62.8	-**
		s.d.	12.9	16.5	12.3	-
		N	18	15	16	-
2.	Calgary Board of Education	Mean	66.1	66.0	66.0	65.7
		s.d.	14.2	14.6	14.1	13.6
		N	514	467	371	363
3.	Province of Alberta	Mean	67.4	66.9	67.2	67.9
		s.d.	13.4	13.5	13.8	13.7
		N	3596	3312	3001	2695

* $F(2, 3793) = 4.92$, $p = 0.01$. Significant difference between Model and both control groups in 1985.

** Student sample less than 5; therefore, analysis is not valid.

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, ACCOUNTING 30,

DEPARTMENT-BASED MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1984-1987

	ACCOUNTING 30		1984	1985	1986*	1987
1.	Department-based Model	Mean	72.4	59.0	46.7	61.4
		s.d.	10.0	23.6	27.4	20.0
		N	17	9	9	7
2.	Calgary Board of Education	Mean	69.1	70.4	68.7	70.5
		s.d.	16.5	15.9	17.5	16.6
		N	624	555	498	433
3.	Province of Alberta	Mean	70.5	70.5	70.0	71.1
		s.d.	15.2	15.1	15.4	15.5
		N	2847	2697	2431	2255

* $F(2, 2937) = 11.06$, $p = <.001$. Significant difference between Model and both control groups in 1986.

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, LAW 30,

DEPARTMENT-BASED MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1984-1987

	LAW 30		1984	1985*	1986	1987
1.	Department-based Model	Mean	60.0	73.5	65.3	70.2
		s.d.	18.1	14.8	11.6	12.3
		N	22	16	15	5
2.	Calgary Board of Education	Mean	60.9	62.6	59.8	64.0
		s.d.	16.9	15.7	15.7	15.8
		N	372	323	352	298
3.	Province of Alberta	Mean	61.9	62.2	61.9	62.9
		s.d.	14.5	13.8	14.2	14.2
		N	2739	2721	2572	2828

* $F(2, 2938) = 3.83$, $p = 0.02$. Significant difference between Model and both control groups in 1985.

PROJECT ABC STUDENT ACHIEVEMENT

ANALYSIS OF VARIANCE OF DEPARTMENT-BASED MODEL,

SYSTEM AND PROVINCE FINAL GRADES

1987

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	TYPING 30	Between Groups	1907.84	2	953.92		
		Within Groups	570784.06	3058	186.65	5.11	0.01
		Total	572691.90	3060			
2.	ACCOUNTING 30	Between Groups	756.15	2	378.08		
		Within Groups	664242.28	2692	246.75	1.53	0.22
		Total	664998.44	2694			
3.	LAW 30	Between Groups	580.65	2	290.33		
		Within Groups	645526.72	3128	206.37	1.41	0.25
		Total	646107.38	3130			

PROJECT ABC STUDENT ACHIEVEMENT

ANALYSIS OF VARIANCE OF DEPARTMENT-BASED MODEL,

SYSTEM AND PROVINCE FINAL GRADES

1986

VARIABLE	SOURCE	SS	df	MS	F	p
1. TYPING 30	Between Groups	767.68	2	383.84		
	Within Groups	643542.17	3385	190.12	2.02	0.13
	Total	644309.85	3387			
2. ACCOUNTING 30	Between Groups	5551.94	2	2775.97		
	Within Groups	736836.74	2935	251.05	11.06	<.001
	Total	742388.68	2937			
3. LAW 30	Between Groups	1586.01	2	793.00		
	Within Groups	607790.00	2936	207.01	3.83	0.02
	Total	609376.01	2938			

PROJECT ABC STUDENT ACHIEVEMENT

ANALYSIS OF VARIANCE DEPARTMENT-BASED MODEL,

SYSTEM AND PROVINCE FINAL GRADES

1985

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	TYPING 30	Between Groups	1831.12	2	915.56		
		Within Groups	705031.80	3791	185.98	4.92	0.01
		Total	706862.92	3793			
2.	ACCOUNTING 30	Between Groups	1188.28	2	594.14		
		Within Groups	755527.67	3258	231.90	2.56	0.08
		Total	756715.95	3260			
3.	LAW 30	Between Groups	2072.99	2	1036.49		
		Within Groups	596964.31	3057	195.28	5.31	0.01
		Total	599037.29	3059			

PROJECT ABC STUDENT ACHIEVEMENT

ANALYSIS OF VARIANCE OF DEPARTMENT-BASED MODEL,

SYSTEM AND PROVINCE FINAL GRADES

1984

VARIABLE	SOURCE	SS	df	MS	F	p
1. TYPING 30	Between Groups	1087.21	2	543.61		
	Within Groups	749368.03	4125	181.67	3.00	0.05
	Total	750455.24	4127			
2. ACCOUNTING 30	Between Groups	1068.49	2	534.24		
	Within Groups	829017.91	3485	237.88	2.25	0.11
	Total	830086.40	3487			
3. LAW 30	Between Groups	399.37	2	199.69		
	Within Groups	685517.27	3130	219.02	0.91	0.40
	Total	685916.64	3132			

PROJECT ABC: DEPARTMENT-BASED MODEL,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1984-1987

STUDENTS

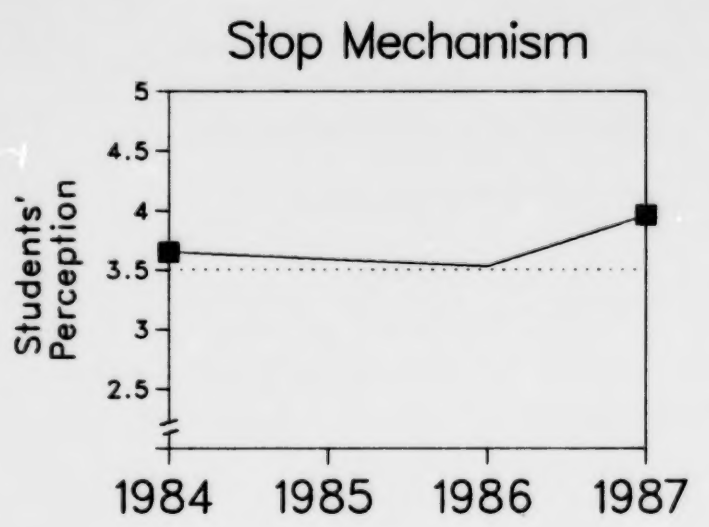
	VARIABLE	1984 Mean s.d. N	1985 Mean s.d. N	1986 Mean s.d. N	1987 Mean s.d. N
1.	STOP MECHANISM	3.7 0.9 217	3.6 1.0 117	3.5 0.9 118	4.0 0.0 23
2.	LEARNING RATE COMPATIBLE WITH ABILITY	2.6 1.3 218	2.5 1.4 119	2.7 1.2 117	2.9 1.1 23
3.	FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	3.9 1.4 213	4.0 1.2 116	3.8 1.3 117	4.0 1.0 23

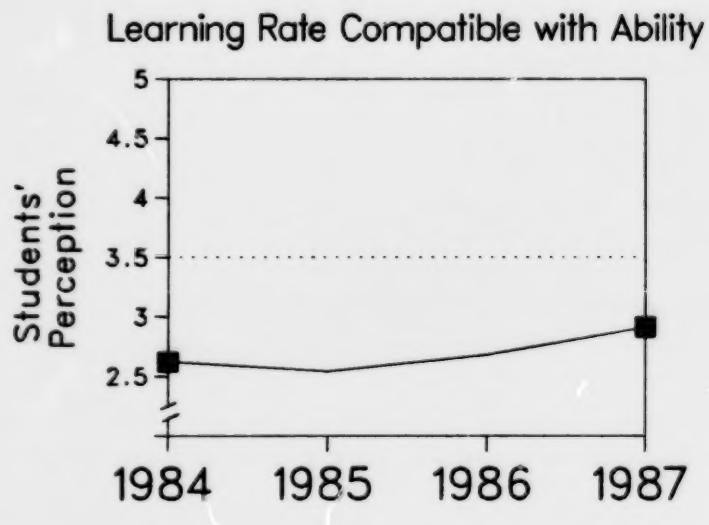
PROJECT ABC: DEPARTMENT-BASED MODEL,
ANALYSIS OF VARIANCE FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

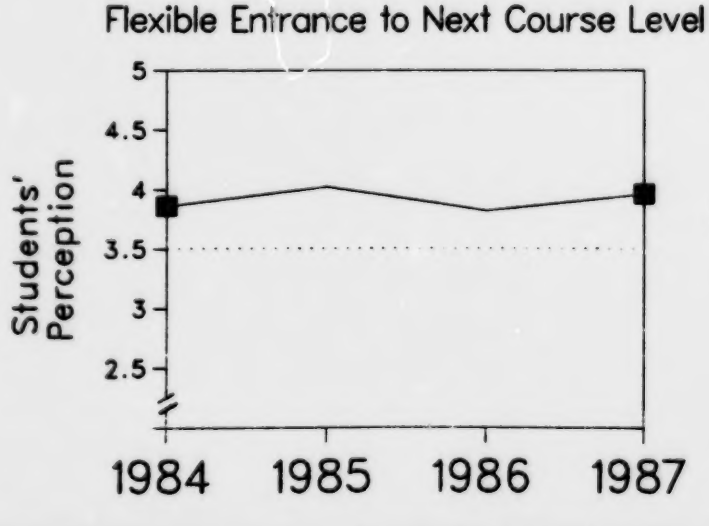
1984-1987

STUDENTS

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	STOP MECHANISM	Between Groups	3.84	3	1.28		
		Within Groups	415.71	471	0.88	1.45	0.23
		Total	419.55	474			
2.	LEARNING RATE COMPATIBLE WITH ABILITY	Between Groups	3.24	3	1.08		
		Within Groups	750.34	473	1.59	0.68	0.56
		Total	753.58	476			
3.	FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	Between Groups	2.74	3	0.91		
		Within Groups	791.93	465	1.70	0.54	0.66
		Total	794.67	468			


Stop Mechanism
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987


Learning Rate Compatible with Ability
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987


Flexible Entrance to Next Course Level
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987

PROJECT ABC: DEPARTMENT-BASED MODEL,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1984-1987

TEACHERS

VARIABLE	1984	1985	1986	1987
	Mean s.d. N	Mean s.d. N	Mean s.d. N	Mean s.d. N
1. STOP MECHANISM	4.7 .5 6	4.3 .8 6	3.8 .4 5	4.4 .5 5
2. LEARNING RATE COMPATIBLE WITH ABILITY	3.8 .7 6	4.0 .8 6	3.8 .4 5	4.6 .5 5
3. FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	4.7 .5 6	4.7 .5 6	3.4 1.2 5	4.2 .4 5

PROJECT ABC: DEPARTMENT-BASED MODEL,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1984-1987

ADMINISTRATORS

VARIABLE	1984 Mean s.d. N	1985 Mean s.d. N	1986 Mean s.d. N	1987 Mean s.d. N
1. STOP MECHANISM	3.7 .5 6	3.8 .4 6	3.8 .4 6	3.8 .4 4
2. LEARNING RATE COMPATIBLE WITH ABILITY	3.5 .5 6	4.0 .6 6	4.0 .8 6	3.8 .4 4
3. FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	3.3 .8 6	4.0 .8 6	3.8 .9 6	4.0 .0 4

PROJECT ABC: DEPARTMENT-BASED MODEL,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1984-1987

STUDENTS

VARIABLE	1984	1985	1986	1987
	Mean s.d. N	Mean s.d. N	Mean s.d. N	Mean s.d. N
1. TEST USE AT UNIT LEVEL	3.9 1.6 214	3.6 1.6 120	3.9 1.4 115	4.5 1.0 23
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING*	2.5 1.7 214	3.1 1.7 119	2.6 1.8 116	3.2 1.6 23
3. ADVANCEMENT BASED ON COMPETENCY	4.4 1.2 218	4.5 1.0 120	4.3 1.2 115	4.5 0.8 23

* $F(3, 471) = 3.48$, $p = 0.02$. Significant difference between 1984 and 1985.

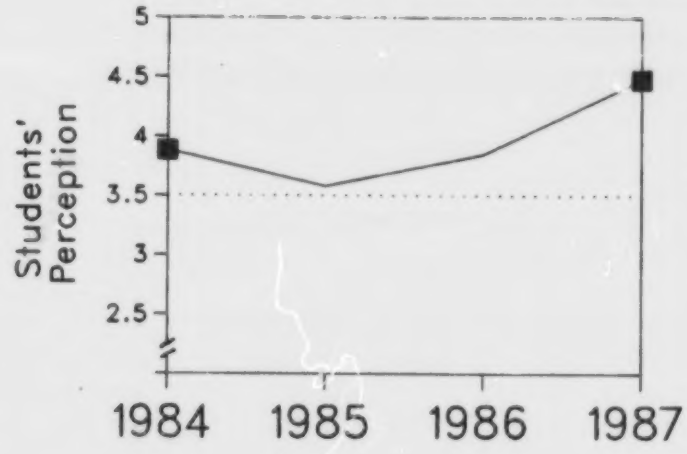
PROJECT ABC: DEPARTMENT-BASED MODEL,
ANALYSIS OF VARIANCE FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1984-1987

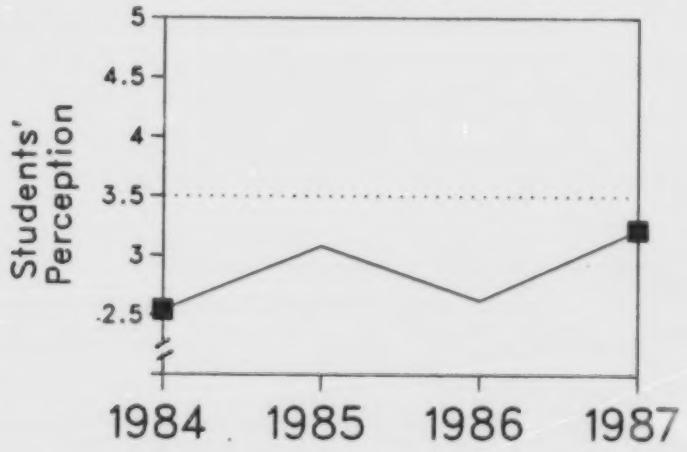
STUDENTS

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	TEST USE AT UNIT LEVEL	Between Groups	18.01	3	6.00		
		Within Groups	1090.39	468	2.33	2.58	0.05
		Total	1108.40	471			
2.	DEMONSTRATE COMPETENCY BEFORE PROCEEDING	Between Groups	29.70	3	9.90		
		Within Groups	1333.58	468	2.85	3.48	0.06
		Total	1363.29	471			
3.	ADVANCEMENT BASED ON COMPETENCY	Between Groups	2.12	3	0.71		
		Within Groups	573.06	472	1.21	0.58	0.63
		Total	575.18	475			

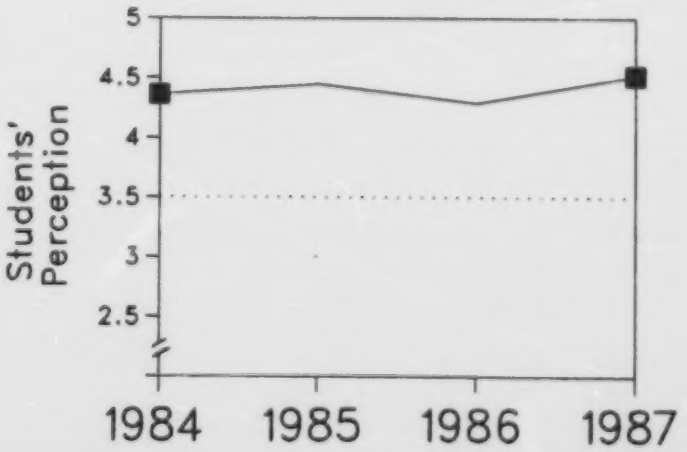
Test Use at Unit Level



Demonstrate Competency before Proceeding



Advancement Based on Competency



PROJECT ABC: DEPARTMENT-BASED MODEL,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1984-1987

TEACHERS

VARIABLE	1984	1985	1986	1987
	Mean s.d. N	Mean s.d. N	Mean s.d. N	Mean s.d. N
1. TEST USE AT UNIT LEVEL	4.8 .4 6	3.7 1.3 6	4.2 .4 5	4.4 .5 5
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING	4.2 .4 6	3.7 .5 6	4.0 1.0 5	4.0 .0 5
3. ADVANCEMENT BASED ON COMPETENCY	4.7 .5 6	4.8 .4 6	4.4 .8 5	4.8 .4 5

PROJECT ABC: DEPARTMENT-BASED MODEL,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1984-1987

ADMINISTRATORS

VARIABLE	1984	1985	1986	1987
	Mean s.d. N	Mean s.d. N	Mean s.d. N	Mean s.d. N
1. TEST USE AT UNIT LEVEL	4.8 .4 6	5.0 .0 6	4.3 .8 6	4.8 .4 4
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING	4.2 .4 6	4.8 .4 6	4.3 .8 6	4.0 .0 4
3. ADVANCEMENT BASED ON COMPETENCY	4.0 .6 6	4.3 .8 6	4.8 .4 6	4.8 .4 4

APPENDIX 2

Statistical Findings

Parallel Core Program Model

COMMENTS

STUDENT ACHIEVEMENT

To respond to the question ***What changes occurred in the achievement of project students during the course of the project***, eight courses: English 30, English 33, Social Studies 30, Math 30, Math 33, Biology 30, Chemistry 30 and Physics 30, were subjected to a univariate analysis of variance with year as a factor to determine change in students' grades over time with the project school. The program employed was the SPSS ONEWAY with ***post hoc*** testing.

Highlights of the statistical analysis indicate that Chemistry 30 was the only course to show any significant change over time. An $F\ (2,\ 114) = 4.55$, $p = 0.01$ was identified in the analysis of variance for Chemistry 30 and the Scheffé procedure (***post hoc*** ONEWAY contrast) yielded a significant difference between the grades in 1985-1986 and 1986-1987. There was a significant increase in the mean from Year 4 to Year 5 of 63.7 to 74.1. The mean grades were significantly different at the .05 level.

To respond to the question ***How did achievement levels of project students compare with those of non-project students within the system and within the province***, the eight courses were subjected to univariate analysis of variance with student population (school, city and province) as a factor to determine signficant differences between groups throughout Project ABC. The program employed was the SPSS-X ONEWAY with ***post hoc*** testing.

Highlights of the statistical analysis indicate that students' grades in Chemistry in 1986-1987 were significantly higher than the city and the province. An $F\ (2,\ 18467) = 4.50$, $p = 0.01$ was identified in the analysis of variance for Chemistry 30 in Year 5 and the Scheffé procedure yielded a significant difference between achievement levels in the school and in the control groups. The mean scores were significantly different at the .05 level.

TIME REMOVED AS A CREDIT REQUIREMENT

The variables ***stop mechanism***, ***learning rate compatible with ability***, and ***flexible entrance to the next course level*** extracted from the student questionnaire were subjected to a univariate analysis of variance with year as a factor to determine change over time. The program employed was the SPSS ONEWAY with ***post hoc*** testing.

Highlights of the statistical analysis indicate that with a project success rate set at a mean score of 3.5, students perceived successful goal attainment in terms of the development of a ***stop mechanism***. They did not perceive a successful level of attainment in terms of the program providing ***compatibility between learning rate and ability*** or in terms of providing ***flexible entrance to the next course level*** and, in fact, the availability of the latter two criteria was perceived to decline significantly over time.

Perceptions about the provision of a ***stop mechanism*** grew significantly during the course of the project with an $F\ (3, 505) = 4.24$, $p = 0.01$. The Scheffé procedure indicated significant differences between 1984 and 1985. There was a significant increase in the means between 1984 and 1985 and while declining in later years from that high, remained in evidence to a satisfactory extent until the end of the project.

Students did not perceive the program providing for ***compatibility between learning rate and ability*** and, in fact, this component declined significantly over time with an $F\ (3, 502) = 8.43$, $p = <.001$. The Scheffé procedure indicated significant differences between 1984 and 1985, 1984 and 1986, and 1984 and 1987. There was a significant decrease in the mean every year compared to 1984.

Students also did not perceive the program providing ***flexible entrance to the next course level*** and this variable declined significantly over time with an $F\ (3, 500) = 26.53$, $p = <.001$. The Scheffé procedure indicated very significant differences between 1984 and 1985, 1984 and 1986, and 1984 and 1987. There was a significant decrease in the mean every year compared with 1984.

Descriptive statistics for teacher and administrator perceptions of these variables, extracted from their respective questionnaires, are also included although no analysis of variance was conducted due to small sample size.

Interview data referred to in the main text is reported in the five Formative Evaluation Reports.

COMPETENCY THE BASIS FOR AWARDING CREDIT

The variables ***test use at the unit level***, ***demonstrated competency at the unit level before proceeding*** and ***advancement based on competency, not time*** on the student questionnaire were also subjected to a univariate analysis of variance with year as a factor to determine change over time. The program employed was the SPSS ONEWAY with ***post hoc*** testing.

Highlights of the statistical analysis indicate that with a project success rate set at a mean score of 3.5, students perceived successful goal attainment in terms of ***test use at the unit level***. They did not, however, perceive a successful level of attainment in terms of requiring ***demonstrated competency before proceeding to the next unit*** or in providing students with the opportunity for ***advancement based on competency*** to the next course level.

Student perceptions regarding the frequency of ***test use at the unit level*** increased significantly in 1985, with an $F\ (3, 505) = 5.39$, $p = <.001$. The Scheffé procedure indicated significant differences between 1984 and 1985. There was a significant increase in the mean from 1984 to 1985.

Students' perception regarding the requirement that students ***demonstrate competency before proceeding to the next unit*** remained at unsatisfactory levels throughout the project and, in fact, declined over time although no significant changes occurred.

Students' perception regarding ***advancement based on competency*** declined significantly during the course of the project. The variable was very significant with an $F\ (3, 495) = 26.71$, $p = <.001$. The Scheffé procedure indicated significant differences between 1984 and 1985, 1984 and 1986, and 1984 and 1987. There was a significant decrease in the mean in every other year compared to 1984. This pattern is similar to that found for the criteria related to time removal as a credit requirement, namely ***learning rate compatibility with ability*** and ***flexible entrance to the next course level***. The similarity of findings regarding these closely-linked concepts provides support for the validity of statistical approaches employed.

Descriptive statistics for teacher and administrator perceptions of these variables are also included although no analysis of variance was conducted due to small sample size.

Interview data referred to in the main text are reported in the five Formative Evaluation Reports.

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT

PARALLEL CORE PROGRAM MODEL

1985-1987

COURSE		1985	1986	1987
1. ENGLISH 30	Mean	65.7	66.2	68.3
	s.d.	10.4	11.0	11.3
	N	41	40	58
2. ENGLISH 33	Mean	63.2	64.1	64.0
	s.d.	6.2	7.2	8.3
	N	10	12	8
3. SOCIAL STUDIES 30	Mean	66.7	70.3	67.4
	s.d.	11.5	10.8	13.3
	N	41	39	57
4. MATH 30	Mean	66.3	65.9	70.8
	s.d.	16.1	17.6	15.2
	N	40	38	51
5. MATH 33	Mean	66.1	59.7	58.0
	s.d.	7.8	16.1	12.1
	N	14	23	27
6. BIOLOGY 30	Mean	66.6	68.0	66.3
	s.d.	15.2	14.6	15.9
	N	34	31	39
7. CHEMISTRY 30*	Mean	70.8	63.7	74.1
	s.d.	15.9	17.8	12.4
	N	37	36	42
8. PHYSICS 30	Mean	70.5	71.2	69.0
	s.d.	16.4	12.9	14.2
	N	31	23	27

* $F(2, 114) = 4.55$, $p = 0.01$. Significant difference between 1986 and 1987.

ANALYSIS OF VARIANCE FOR STUDENT ACHIEVEMENT

PARALLEL CORE PROGRAM MODEL

1985-1987

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	ENGLISH 30	Between Groups	191.41	2	95.71		
		Within Groups	16259.87	136	119.56	0.80	0.45
		Total	16451.28	138			
2.	ENGLISH 33	Between Groups	4.85	2	2.43		
		Within Groups	1398.52	27	51.80	0.05	0.95
		Total	1403.37	29			
3.	SOCIAL STUDIES 30	Between Groups	291.17	2	145.59		
		Within Groups	19647.82	134	146.63	1.00	0.37
		Total	19938.99	136			
4.	MATH 30	Between Groups	691.35	2	345.68		
		Within Groups	33158.61	126	263.16	1.31	0.27
		Total	33849.97	128			
5.	MATH 33	Between Groups	617.20	2	308.60		
		Within Groups	10273.80	61	168.42	1.83	0.17
		Total	10891.00	63			
6.	BIOLOGY 30	Between Groups	53.99	2	26.99		
		Within Groups	23693.05	101	234.58	0.12	0.89
		Total	23747.04	103			
7.	CHEMISTRY 30	Between Groups	2155.82	2	1077.91		
		Within Groups	26527.18	112	236.85	4.55	0.01
		Total	28682.99	114			
8.	PHYSICS 30	Between Groups	71.97	2	35.98		
		Within Groups	16938.26	78	217.16	0.17	0.85
		Total	17010.22	80			

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, ENGLISH 30,

PARALLEL CORE PROGRAM MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1985-1987

	ENGLISH 30		1985	1986	1987
1.	Parallel Core Program Model	Mean	65.7	66.2	68.3
		s.d.	10.4	11.0	11.3
		N	41	40	58
2.	Calgary Board of Education	Mean	63.1	63.5	64.9
		s.d.	11.1	11.2	11.1
		N	4622	4473	4571
3.	Province of Alberta	Mean	63.8	64.2	65.0
		s.d.	10.5	10.6	11.0
		N	20612	21408	22294

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT,

SOCIAL STUDIES 30, PARALLEL CORE PROGRAM MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1985-1987

	SOCIAL STUDIES 30		1985	1986	1987
1.	Parallel Core Program Model	Mean	66.7	70.3	67.4
		s.d.	11.5	10.8	13.3
		N	41	39	57
2.	Calgary Board of Education	Mean	65.5	66.9	65.3
		s.d.	12.0	12.3	12.4
		N	3874	3553	3643
3.	Province of Alberta	Mean	64.2	66.1	64.8
		s.d.	12.0	12.1	12.6
		N	18699	18855	19563

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, MATH 30,

PARALLEL CORE PROGRAM MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1985-1987

	MATH 30		1985	1986	1987
1.	Parallel Core Program Model	Mean	66.3	65.9	70.8
		s.d.	16.1	17.6	15.2
		N	40	38	51
2.	Calgary Board of Education	Mean	63.4	63.6	67.7
		s.d.	15.1	15.5	15.7
		N	4197	3788	3967
3.	Province of Alberta	Mean	64.5	65.1	68.3
		s.d.	15.0	15.5	15.7
		N	17094	17470	22453

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, MATH 33,

PARALLEL CORE PROGRAM MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1985-1987

MATH 33		1985	1986	1987*
1. Parallel Core Program Model	Mean	66.1	59.7	58.0
	s.d.	7.8	16.1	12.1
	N	14	23	27
2. Calgary Board of Education	Mean	57.7	56.1	56.7
	s.d.	13.3	13.9	13.4
	N	1836	1916	2019
3. Province of Alberta	Mean	58.2	57.9	58.3
	s.d.	12.9	13.3	13.3
	N	7625	7748	8465

* $F(2, 18467) = 4.50$, $p = 0.01$. Significant difference between the Model and both control groups in 1987.

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, BIOLOGY 30,

PARALLEL CORE PROGRAM MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1985-1987

BIOLOGY 30		1985	1986	1987
1. Parallel Core Program Model	Mean	66.6	68.0	66.3
	s.d.	15.2	14.6	15.9
	N	34	31	39
2. Calgary Board of Education	Mean	64.9	66.0	65.6
	s.d.	14.1	14.3	14.9
	N	3254	3254	3581
3. Province of Alberta	Mean	65.9	66.4	66.0
	s.d.	13.7	13.9	14.8
	N	14929	16647	17844

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, CHEMISTRY 30,

PARALLEL CORE PROGRAM MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1985-1987

CHEMISTRY 30		1985	1986	1987*
1. Parallel Core Program Model	Mean	70.8	63.7	74.1
	s.d.	15.9	17.8	12.4
	N	37	36	42
2. Calgary Board of Education	Mean	65.7	65.5	68.4
	s.d.	15.2	15.2	14.9
	N	3244	2934	2955
3. Province of Alberta	Mean	65.6	65.4	68.0
	s.d.	14.6	14.8	14.7
	N	14266	14747	15471

* $F(2, 18467) = 4.50$, $p = 0.01$. Significant difference between Model and both control groups in 1987.

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, PHYSICS 30,

PARALLEL CORE PROGRAM MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1985-1987

PHYSICS 30		1985	1986	1987
1. Parallel Core Program Model	Mean	70.5	71.2	68.9
	s.d.	16.4	12.9	14.2
	N	31	23	27
2. Calgary Board of Education	Mean	66.5	67.1	68.2
	s.d.	14.2	14.6	14.8
	N	1897	1671	1612
3. Province of Alberta	Mean	66.6	67.3	67.8
	s.d.	13.8	14.2	14.5
	N	7956	7946	8181

PROJECT ABC STUDENT ACHIEVEMENT

ANALYSIS OF VARIANCE OF PARALLEL CORE PROGRAM MODEL,

SYSTEM AND PROVINCE FINAL GRADES

1987

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	ENGLISH 30	Between Groups	643.60	2	321.80		
		Within Groups	3273041.13	26920	121.58	2.65	0.07
		Total	3273684.73	26922			
2.	SOCIAL STUDIES 30	Between Groups	914.15	2	457.08		
		Within Groups	3659410.94	23260	157.33	2.91	0.06
		Total	3660325.10	23262			
3.	MATH 30	Between Groups	1639.49	2	819.75		
		Within Groups	5546514.91	22450	247.06	3.32	0.04*
		Total	5548154.40	22452			
4.	MATH 33	Between Groups	4091.99	2	2045.99		
		Within Groups	1852652.75	10508	176.31	11.61	<.001**
		Total	1856744.74	10510			
5.	BIOLOGY 30	Between Groups	512.52	2	256.26		
		Within Groups	4695273.65	21461	218.78	1.17	0.31
		Total	4695786.17	21463			
6.	CHEMISTRY 30	Between Groups	1948.56	2	974.28		
		Within Groups	4001054.35	18465	216.68	4.50	0.01
		Total	4003002.91	18467			
7.	PHYSICS 30	Between Groups	234.36	2	117.18		
		Within Groups	2070961.38	9817	210.96	0.56	0.57
		Total	2071195.74	9819			

* *Post hoc* tests indicated differences were not significant.

** Significant difference occurred between control groups only.

PROJECT ABC STUDENT ACHIEVEMENT

ANALYSIS OF VARIANCE OF PARALLEL CORE PROGRAM MODEL,

SYSTEM AND PROVINCE FINAL GRADES

1986

VARIABLE	SOURCE	SS	df	MS	F	p
1. ENGLISH 30	Between Groups	2139.15	2	1069.57		
	Within Groups	2989661.24	25918	115.35	9.27	<.001*
	Total	2991800.39	25920			
2. SOCIAL STUDIES 30	Between Groups	2189.80	2	1094.90		
	Within Groups	3293363.13	22444	146.74	7.46	<.001*
	Total	3295552.93	22446			
3. MATH 30	Between Groups	6747.14	2	3373.57		
	Within Groups	5092276.98	21293	239.15	14.11	<.001*
	Total	5099024.12	21295			
4. MATH 33	Between Groups	4982.06	2	2491.03		
	Within Groups	1754501.27	9684	181.18	13.75	<.001*
	Total	1759483.33	9686			
5. BIOLOGY 30	Between Groups	480.74	2	240.37		
	Within Groups	3901142.55	19929	195.75	1.23	0.29
	Total	3901623.28	19931			
6. CHEMISTRY 30	Between Groups	117.88	2	58.94		
	Within Groups	3918035.31	17714	221.18	0.27	0.77
	Total	3918153.19	17716			
7. PHYSICS 30	Between Groups	438.50	2	219.25		
	Within Groups	1956949.88	9637	203.07	1.08	0.34
	Total	1957388.38	9639			

* Significant differences occurred between control groups only.

PROJECT ABC STUDENT ACHIEVEMENT

ANALYSIS OF VARIANCE OF PARALLEL CORE PROGRAM MODEL,

SYSTEM AND PROVINCE FINAL GRADES

1985

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	ENGLISH 30	Between Groups	2136.51	2	1068.26		
		Within Groups	2849919.39	25272	112.77	9.47	<.001*
		Total	2852055.90	25274			
2.	SOCIAL STUDIES 30	Between Groups	5346.92	2	2673.46		
		Within Groups	3269422.36	22611	144.59	18.49	<.001*
		Total	3274769.28	22613			
3.	MATH 30	Between Groups	4438.54	2	2219.27		
		Within Groups	4815873.65	21328	225.80	9.83	<.001*
		Total	4820312.19	21330			
4.	MATH 33	Between Groups	1299.94	2	649.97		
		Within Groups	1599612.91	9472	168.88	3.85	0.02**
		Total	1600912.85	9474			
5.	BIOLOGY 30	Between Groups	2624.58	2	1312.29		
		Within Groups	3452151.93	18214	189.53	6.92	<.001*
		Total	3454776.51	18216			
6.	CHEMISTRY 30	Between Groups	1000.21	2	500.11		
		Within Groups	3801134.09	17544	216.66	2.31	0.10
		Total	3802134.30	17546			
7.	PHYSICS 30	Between Groups	470.19	2	235.10		
		Within Groups	1916526.38	9881	193.96	1.21	0.30
		Total	1916996.57	9883			

* Significant differences occurred between control groups only.

** *Post hoc* tests indicated differences were not significant.

PROJECT ABC: PARALLEL CORE PROGRAM MODEL,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1984-1987

STUDENTS

VARIABLE	1984	1985	1986	1987
	Mean	Mean	Mean	Mean
	s.d.	s.d.	s.d.	s.d.
	N	N	N	N
1. STOP MECHANISM*	3.6	4.0	3.9	3.9
	1.0	0.9	0.7	0.6
	142	192	115	57
2. LEARNING RATE COMPATIBLE WITH ABILITY**	2.8	2.3	2.3	2.3
	1.1	1.1	1.1	0.8
	141	192	114	56
3. FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL***	3.3	2.4	2.3	2.4
	1.2	1.1	1.0	0.9
	141	191	114	55

* $F(3, 505) = 4.24$, $p = 0.01$. Significant difference between 1984 and 1985.

** $F(3, 502) = 8.43$, $p = <.001$. Significant difference between 1984 and 1985, 1984 and 1986, 1984 and 1987.

*** $F(3, 500) = 26.53$, $p = <.001$. Significant difference between 1984 and 1985, 1984 and 1986, 1984 and 1987.

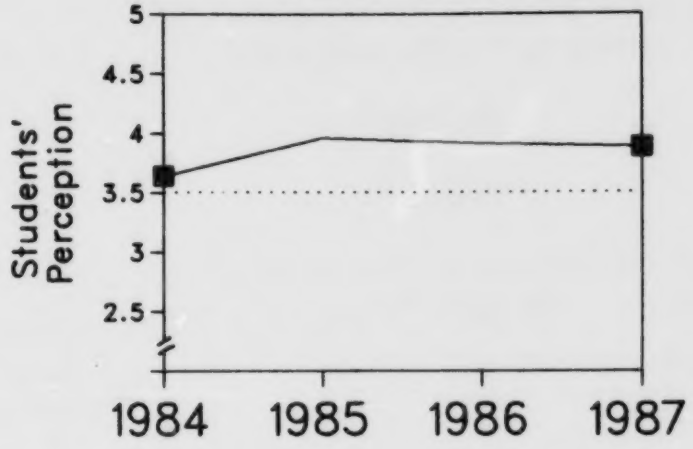
PROJECT ABC: PARALLEL CORE PROGRAM MODEL,
ANALYSIS OF VARIANCE FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1984-1987

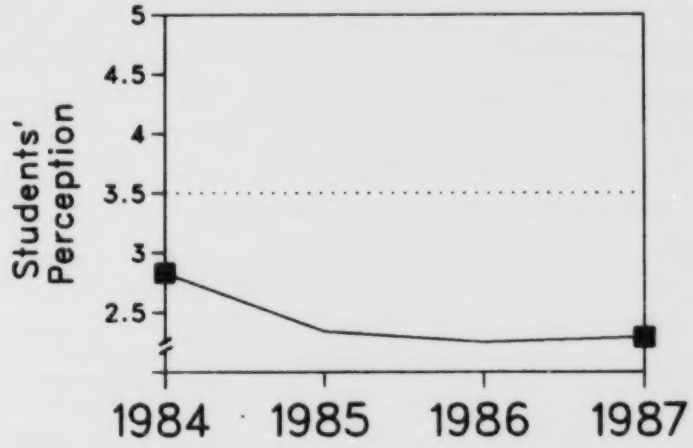
STUDENTS

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	STOP MECHANISM	Between Groups	8.96	3	2.99		
		Within Groups	353.62	502	0.70	4.24	0.01
		Total	362.59	505			
2.	LEARNING RATE COMPATIBLE WITH ABILITY	Between Groups	28.60	3	9.53		
		Within Groups	563.96	499	1.13	8.43	<.001
		Total	592.56	502			
3.	FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	Between Groups	93.91	3	31.30		
		Within Groups	586.51	497	1.18	26.53	<.001
		Total	680.42	500			

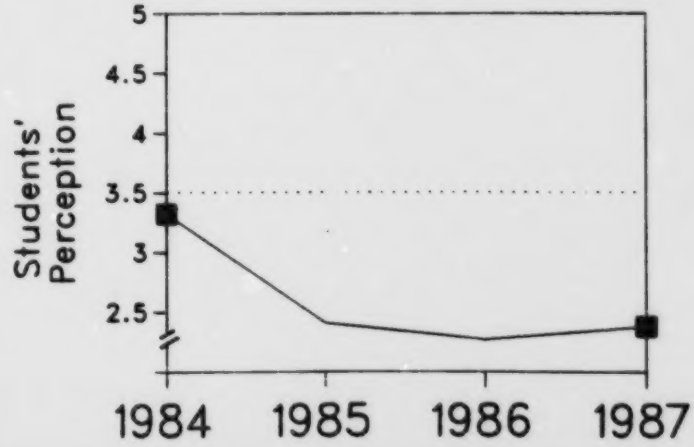
Stop Mechanism



Learning Rate Compatible with Ability



Flexible Entrance to Next Course Level



PROJECT ABC: PARALLEL CORE PROGRAM MODEL,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1984-1987

TEACHERS

VARIABLE	1984	1985	1986	1987
	Mean	Mean	Mean	Mean
	s.d.	s.d.	s.d.	s.d.
	N	N	N	N
1. STOP MECHANISM	4.0	3.9	4.3	3.9
	.6	.9	1.0	.9
	8	10	8	11
2. LEARNING RATE COMPATIBLE WITH ABILITY	2.6	2.5	3.4	2.6
	.5	1.3	1.5	1.3
	8	10	8	11
3. FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	3.6	2.5	3.0	1.8
	1.5	1.6	1.7	.6
	8	10	8	11

PROJECT ABC: PARALLEL CORE PROGRAM MODEL,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1984-1987

ADMINISTRATORS

VARIABLE	1984	1985	1986	1987
	Mean	Mean	Mean	Mean
	s.d.	s.d.	s.d.	s.d.
	N	N	N	N
1. STOP MECHANISM	3.7	3.7	3.7	3.8
	1.4	.9	.9	.4
	6	8	8	6
2. LEARNING RATE COMPATIBLE WITH ABILITY	2.0	2.5	2.8	2.4
	.6	.5	1.0	1.0
	6	8	8	6
3. FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	1.7	1.5	1.9	1.5
	.8	.5	.8	.5
	6	8	8	6

PROJECT ABC: PARALLEL CORE PROGRAM MODEL,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1984-1987

STUDENTS

VARIABLE	1984	1985	1986	1987
	Mean	Mean	Mean	Mean
	s.d.	s.d.	s.d.	s.d.
	N	N	N	N
1. TEST USE AT UNIT LEVEL*	4.3	4.7	4.5	4.5
	1.3	0.6	0.7	0.7
	142	192	115	57
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING	2.7	2.8	2.6	2.4
	1.2	1.0	0.9	0.9
	136	192	115	56
3. ADVANCEMENT BASED ON COMPETENCY**	3.3	2.3	2.0	2.3
	1.3	1.2	1.2	1.1
	137	191	113	55

* $F(3, 505) = 5.39$, $p = <.001$. Significant difference between 1984 and 1985.

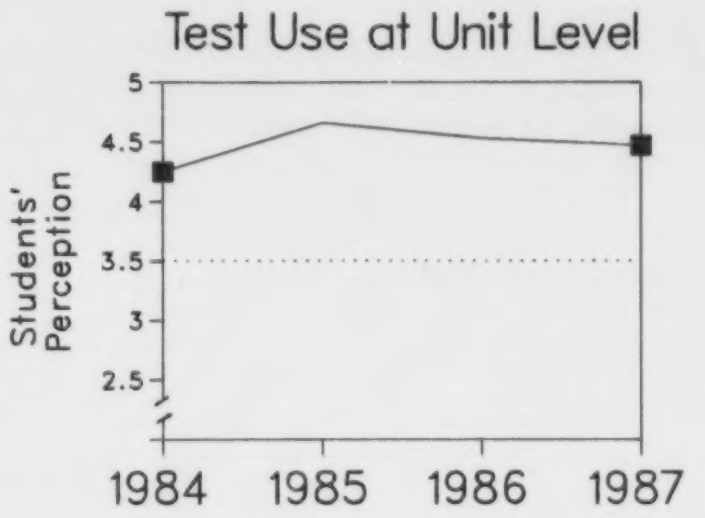
** $F(3, 495) = 26.71$, $p = <.001$. Significant difference between 1984 and 1985, 1984 and 1986, 1984 and 1987.

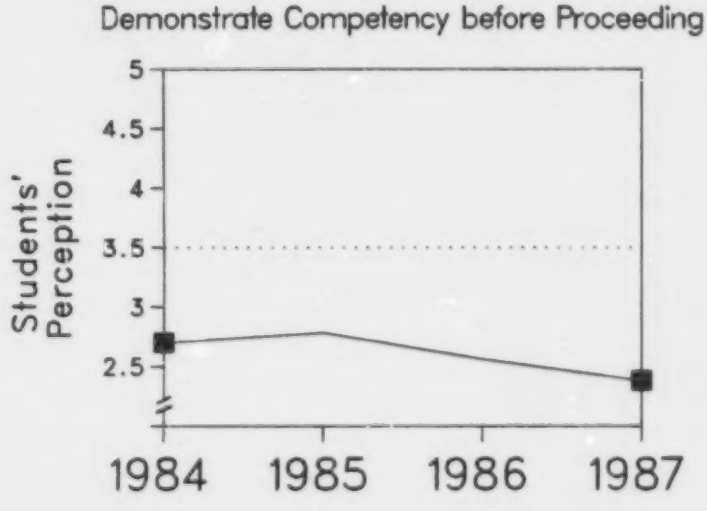
PROJECT ABC: PARALLEL CORE PROGRAM MODEL,
ANALYSIS OF VARIANCE FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

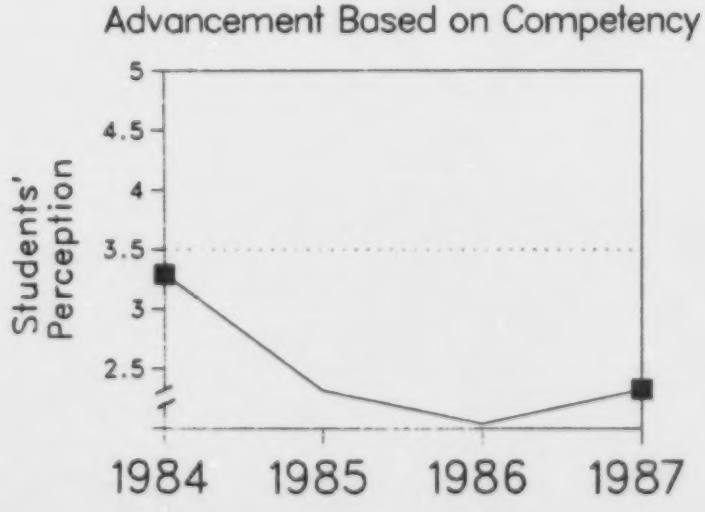
1984-1987

STUDENTS

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	TEST USE AT UNIT LEVEL	Between Groups	13.44	3	4.48		
		Within Groups	417.04	502	0.83	5.39	<.001
		Total	430.48	505			
2.	DEMONSTRATE COMPETENCY BEFORE PROCEEDING	Between Groups	8.57	3	2.86		
		Within Groups	541.52	495	1.09	2.61	0.05
		Total	550.08	498			
3.	ADVANCEMENT BASED ON COMPETENCY	Between Groups	117.90	3	39.30		
		Within Groups	723.81	492	1.47	26.71	<.001
		Total	841.71	495			


Test Use at Unit Level
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987


Demonstrate Competency before Proceeding
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987


Advancement Based on Competency
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987

PROJECT ABC: PARALLEL CORE PROGRAM MODEL,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1984-1987

TEACHERS

VARIABLE	1984	1985	1986	1987
	Mean s.d. N	Mean s.d. N	Mean s.d. N	Mean s.d. N
1. TEST USE AT UNIT LEVEL	4.8 .4 8	4.9 .3 10	5.0 .0 8	4.9 .3 11
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING	2.5 1.1 8	3.2 .8 10	3.4 1.2 8	2.7 .7 11
3. ADVANCEMENT BASED ON COMPETENCY	3.8 1.5 8	3.2 1.4 10	3.9 1.5 8	2.1 .7 11

PROJECT ABC: PARALLEL CORE PROGRAM MODEL,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1984-1987

ADMINISTRATORS

VARIABLE	1984	1985	1986	1987
	Mean s.d. N	Mean s.d. N	Mean s.d. N	Mean s.d. N
1. TEST USE AT UNIT LEVEL	4.7 .5 6	4.6 .7 8	4.7 .5 8	4.7 .5 6
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING	3.5 1.0 6	3.2 1.2 8	3.5 1.0 8	3.3 .8 6
3. ADVANCEMENT BASED ON COMPETENCY	1.6 .8 6	1.5 .8 8	1.7 .7 8	2.2 1.3 6

APPENDIX 3

Statistical Findings

School-wide Model

Comments

STUDENT ACHIEVEMENT

To respond to the question ***What changes occurred to the achievement of progress students during the course of the project***, Math 30, Math 33 and Typing 30 were subjected to univariate analysis of variance with year as a factor to determine change over time in students' achievement levels within the project school. The program employed was the SPSS ONEWAY with ***post hoc*** testing.

Highlights of the statistical analysis indicate that Math 30 showed significant change over time. An $F\ (1, 74) = 8.75$, $p = <.001$ was identified in Scheffé procedure (***post hoc*** ONEWAY contrast) yielded a significant difference between the grades in 1985-1986 and 1986-1987. There was a significant increase in the mean from 60.6 to 73.3 The mean grades were significantly different at the .05 level.

To respond to the question ***How did achievement levels of project students compare with those of non-project students within the system and within the province***, eight courses were subjected to univariate analysis of variance with student population (school, city and province) as a factor to determine significant differences between groups throughout Project ABC. The program employed was the SPSS-X ONEWAY with ***post hoc*** testing.

Highlights of the statistical analysis indicate that students' grades in Math 30 in 1986-1987 were significantly higher than the city and the province and their grades in English 30 were significantly lower than the control groups in the final year of Project ABC. An $F\ (2, 22467) = 6.01$, $p = <.001$ was identified in the analysis of variance for Math 30 in Year 5 and the Scheffé procedure yielded a significant difference between the achievement levels in the school and the controls. An $F\ (2, 26976) = 8.04$, $p = <.001$ was identified in the analysis of variance for English 30 in Year 5 and the Scheffé procedure yielded a significant difference between the achievement levels in the school and in the control groups. Both were significantly different at the .05 level.

TIME REMOVED AS A CREDIT REQUIREMENT

The variables ***stop mechanism***, ***learning rate compatible with ability***, and ***flexible entrance to the next course level*** extracted from the student questionnaire were subjected to univariate analysis of variance with year as a factor to determine change over time. The program employed was the SPSS ONEWAY with ***post hoc*** testing.

Highlights of the statistical analysis indicate that with a project success rate set at a mean score of 3.5, the students perceived successful goal attainment in terms of the development of a ***stop mechanism*** and in providing ***flexible entrance to the next course level*** in 1986 but their views of variable frequency fell back in 1987, and did not achieve success in terms of providing ***compatibility between learning rate and ability***. All three items were still very volatile by project end.

Students' perceptions indicated that the provision of a ***stop mechanism*** while satisfactory in 1984 to 1986, declined in 1987. This variable was very significant with an $F\ (3, 3759) = 10.19$, $p = <.001$. The Scheffé procedure indicated significant differences between 1984 and 1987, 1985 and 1987, and 1986 and 1987. The mean for 1987 was significantly lower than the previous three years' means.

Students' perceptions regarding the provision for ***compatibility between learning rate and ability*** remained at developmental levels from 1984 to 1986 (i.e., mean scores between 3.0 and 3.5) but declined significantly in 1987. The variable was very significant with an $F\ (3, 3753) = 87.83$, $p = <.001$. The Scheffé procedure indicated significant differences between 1984 and 1987, 1985 and 1987, and 1986 and 1987. The mean for 1987 was significantly lower than the mean in any of the three previous years.

Students' perceptions regarding the provision of ***flexible entrance to the next course level*** also declined by project end. The variable was very significant with an $F\ (3, 3734) = 27.84$, $p = <.001$. The Scheffé procedure indicated significant differences between 1984 and 1987, 1985 and 1987, 1986 and 1987, and 1984 and 1985. There was a significant decrease in the mean from 1984 to 1985 and the mean for 1987 was significantly lower than the mean in any of the three previous years.

Descriptive statistics for teacher and administrator perceptions of these variables, extracted from their respective questionnaires, are also included although no analysis of variance was conducted due to small sample size.

Interview data referred to in the main text is reported in the five Formative Evaluation Reports.

COMPETENCY THE BASIS FOR AWARDING CREDIT

The variables ***test use at the unit level***, ***demonstrated competency at the unit level before proceeding*** and ***advancement based on competency, not time*** on the student questionnaire were also subjected to a univariate analysis of variance with year as a factor to determine change over time. The program employed was the SPSS ONEWAY with ***post hoc*** testing.

Highlights of the statistical analysis indicate that with a project success rate set at a mean score of 3.5, students perceived successful goal attainment in relation to all three criteria for competency becoming the basis for awarding credit.

Test use at the unit level was perceived by students to be at satisfactory levels throughout the project. The variable was very significant with an $F\ (3, 3759) = 39.13$, $p = <.001$. The Scheffé procedure indicated significant differences between 1984 and 1986, 1984 and 1987, 1985 and 1986, 1985 and 1987, and 1986 and 1987. There was a significant increase in the mean from 1984 and 1985 to 1986, and from 1984 and 1985 to 1987. There was also a significant increase in the mean from 1986 to 1987.

Students' perceptions regarding the requirement that students ***demonstrate competency before proceeding to the next unit*** attained a project success level in 1986 and although declining somewhat in 1987, remained satisfactory. This variable was very significant with an $F\ (3, 3753) = 21.40$, $p = <.001$. The Scheffé procedure indicated significant differences between 1984 and 1986, 1985 and 1986, 1985 and 1987, and 1986 and 1987. There was a significant increase in the mean from 1984 and 1985 to 1986, and 1985 to 1987. There was a significant decrease in the mean from 1986 to 1987.

Students' perceptions regarding the criterion of ***advancement based on competency*** remained at satisfactory levels throughout the study. The variable was significant with an $F\ (3, 3751) = 4.50$, $p = <.001$. The Scheffé procedure indicated significant differences between 1984 and 1985, and 1985 and 1986. There was a significant decrease in the mean from 1984 to 1985 and then a significant increase from 1985 to 1986.

Descriptive statistics for teacher and administrator perceptions of these variables are also included although no analysis of variance was conducted due to small sample size.

Interview data referred to in the main text is reported in the five Formative Evaluation Reports.

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT

SCHOOL-WIDE MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1986-1987

	COURSE		1986	1987
1.	MATH 30*	Mean	60.6	73.3
		s.d.	9.9	13.0
		N	10	65
2.	MATH 33	Mean	56.3	55.4
		s.d.	16.5	15.6
		N	44	38
3.	TYPING 30	Mean	65.9	70.7
		s.d.	20.1	12.8
		N	17	17

* $F\ (1, 74) = 8.75$, $p = <.001$. Significant difference between 1986 and 1987.

ANALYSIS OF VARIANCE FOR STUDENT ACHIEVEMENT

SCHOOL-WIDE MODEL

1986-1987

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	MATH 30	Between Groups	1399.54	1	1399.54		
		Within Groups	11674.25	73	159.92	8.75	<.001
		Total	13073.79	74			
2.	MATH 33	Between Groups	14.92	1	14.92		
		Within Groups	20595.33	80	257.44	0.06	0.81
		Total	20610.24	81			
3.	TYPING 30	Between Groups	192.97	1	192.97		
		Within Groups	9068.47	32	283.39	0.68	0.42
		Total	9261.44	33			

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, MATH 30,

SCHOOL-WIDE MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1986-1987

	MATH 30		1986	1987*
1.	School-wide Model	Mean	60.6	73.3
		s.d.	9.9	13.0
		N	10	65
2.	Calgary Board of Education	Mean	63.6	67.7
		s.d.	15.5	15.7
		N	3788	3967
3.	Province of Alberta	Mean	65.1	68.3
		s.d.	15.5	15.7
		N	17470	18435

* $F(2, 22467) = 6.01$, $p = <.001$. Significant difference between Model and both control groups in 1987.

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, MATH 33,

SCHOOL-WIDE MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1986-1987

	MATH 33		1986	1987
1.	School-wide Model	Mean	56.3	55.4
		s.d.	16.5	15.6
		N	44	38
2.	Calgary Board of Education	Mean	56.1	56.7
		s.d.	13.9	13.4
		N	1916	2019
3.	Province of Alberta	Mean	57.9	58.3
		s.d.	13.3	13.3
		N	7748	8465

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, TYPING 30,

SCHOOL-WIDE MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1986-1987

	TYPING 30		1986	1987
1.	School-wide Model	Mean	65.9	70.7
		s.d.	20.1	12.8
		N	17	17
2.	Calgary Board of Education	Mean	66.0	65.7
		s.d.	14.1	13.6
		N	371	363
3.	Province of Alberta	Mean	67.2	67.9
		s.d.	13.8	13.7
		N	3001	2695

. DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, ENGLISH 30,

SCHOOL-WIDE MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1987

	ENGLISH 30		1987*
1.	School-wide Model	Mean	60.8
		s.d.	9.9
		N	112
2.	Calgary Board of Education	Mean	64.9
		s.d.	11.1
		N	4575
3.	Province of Alberta	Mean	65.0
		s.d.	11.0
		N	22294

* F (2, 26976) = 8.04, p = <.001. Significant difference between Model and both control groups in 1987.

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT,

SOCIAL STUDIES 30, SCHOOL-WIDE MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1987

	SOCIAL STUDIES 30		1987
1.	School-wide Model	Mean	64.2
		s.d.	11.1
		N	103
2.	Calgary Board of Education	Mean	65.3
		s.d.	12.4
		N	3643
3.	Province of Alberta	Mean	64.8
		s.d.	12.6
		N	19563

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, BIOLOGY 30,

SCHOOL-WIDE MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1987

	BIOLOGY 30		1987
1.	School-wide Model	Mean	64.1
		s.d.	13.8
		N	61
2.	Calgary Board of Education	Mean	65.6
		s.d.	14.9
		N	3581
3.	Province of Alberta	Mean	66.0
		s.d.	14.8
		N	17844

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, CHEMISTRY 30,

SCHOOL-WIDE MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1987

	CHEMISTRY 30		1987
1.	School-wide Model	Mean	71.7
		s.d.	13.0
		N	68
2.	Calgary Board of Education	Mean	68.4
		s.d.	14.9
		N	2955
3.	Province of Alberta	Mean	68.0
		s.d.	14.7
		N	15471

DESCRIPTIVE STATISTICS FOR STUDENT ACHIEVEMENT, PHYSICS 30,

SCHOOL-WIDE MODEL,

CALGARY BOARD OF EDUCATION AND PROVINCE OF ALBERTA

1987

	PHYSICS 30		1987
1.	School-wide Model	Mean	64.7
		s.d.	12.1
		N	38
2.	Calgary Board of Education	Mean	68.2
		s.d.	14.8
		N	1612
3.	Province of Alberta	Mean	67.8
		s.d.	14.5
		N	8181

PROJECT ABC STUDENT ACHIEVEMENT

ANALYSIS OF VARIANCE OF SCHOOL-WIDE MODEL,

SYSTEM AND PROVINCE FINAL GRADES

1987

VARIABLE	SOURCE	SS	df	MS	F	p
1. MATH 30	Between Groups	2967.85	2	1483.92		
	Within Groups	5545734.01	22464	246.87	6.01	<.001
	Total	5548701.86	22467			
2. MATH 33	Between Groups	4339.50	2	2169.75		
	Within Groups	1857799.83	10519	176.61	12.29	<.001*
	Total	1862139.33	10521			
3. TYPING 30	Between Groups	1664.89	2	832.45		
	Within Groups	573347.59	3072	186.64	4.46	0.01*
	Total	575012.48	3074			
4. ENGLISH 30	Between Groups	1954.14	2	977.07		
	Within Groups	3276580.79	26974	121.47	8.04	<.001
	Total	3278534.93	26976			
5. SOCIAL STUDIES 30	Between Groups	618.85	2	309.42		
	Within Groups	3662160.15	23306	157.13	2.00	0.14
	Total	3662779.00	23308			
6. BIOLOGY 30	Between Groups	717.94	2	358.97		
	Within Groups	4697109.57	21483	218.64	1.64	0.19
	Total	4697827.51	21485			
7. CHEMISTRY 30	Between Groups	1313.56	2	656.78		
	Within Groups	4006038.44	18491	216.65	3.03	0.05**
	Total	4007352.01	18493			
8. PHYSICS 30	Between Groups	587.98	2	293.99		
	Within Groups	2071128.08	9828	210.74	1.40	0.25
	Total	2071716.06	9830			

* Significant differences occurred between control groups only.

** *Post hoc* tests indicated differences were not significant.

PROJECT ABC STUDENT ACHIEVEMENT

ANALYSIS OF VARIANCE OF SCHOOL-WIDE MODEL,

SYSTEM AND PROVINCE FINAL GRADES

1986

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	MATH 30	Between Groups	6881.00	2	3440.50		
		Within Groups	5081729.49	21265	238.97	14.40	<.001*
		Total	5088610.49	21267			
2.	MATH 33	Between Groups	4940.17	2	2470.08		
		Within Groups	1760462.65	9705	181.40	13.62	<.001*
		Total	1765402.82	9707			
3.	TYPING 30	Between Groups	489.69	2	244.84		
		Within Groups	647716.11	3386	191.29	1.28	0.28
		Total	648205.80	3388			

* Significant differences occurred between control groups only.

PROJECT ABC: SCHOOL-WIDE MODEL,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1984-1987

STUDENTS

VARIABLE	1984	1985	1986	1987
	Mean s.d. N	Mean s.d. N	Mean s.d. N	Mean s.d. N
1. STOP MECHANISM*	3.7 1.0 413	3.7 1.0 783	3.6 1.0 999	3.5 1.0 1565
2. LEARNING RATE COMPATIBLE WITH ABILITY**	3.4 1.2 410	3.2 1.4 783	3.4 1.3 997	2.7 1.2 1564
3. FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL***	4.0 1.4 407	3.6 1.4 782	3.8 1.3 989	3.4 1.4 1557

*F (3, 3759) = 10.19, p = <.001. Significant difference between 1984 and 1987, 1985 and 1987, 1986 and 1987.

**F (3, 3753) = 87.83, p = <.001. Significant difference between 1984 and 1987, 1985 and 1987, 1986 and 1987.

*** F (3, 3734) = 27.84, p = <.001. Significant difference between 1984 and 1987, 1985 and 1987, 1986 and 1987.

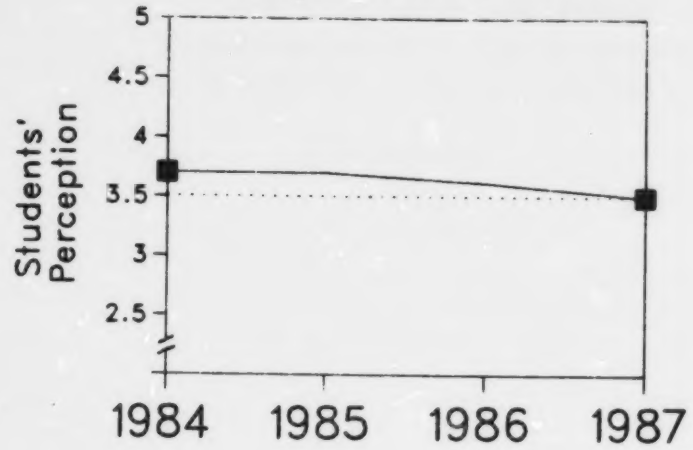
PROJECT ABC: SCHOOL-WIDE MODEL,
ANALYSIS OF VARIANCE FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1984-1987

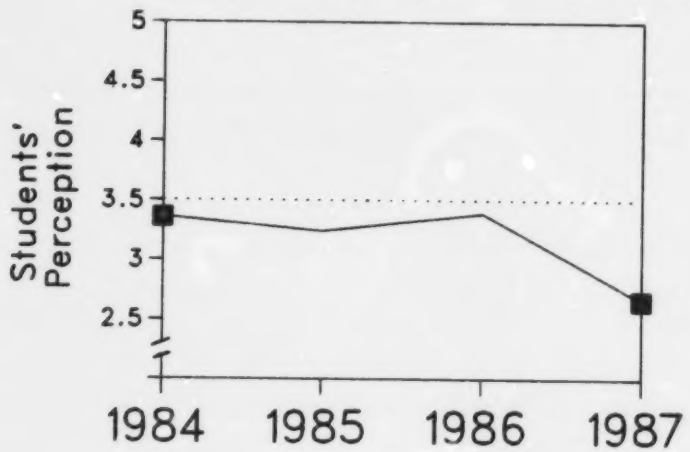
STUDENTS

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	STOP MECHANISM	Between Groups	30.17	3	10.06		
		Within Groups	3706.12	3756	0.99	10.19	<.001
		Total	3736.29	3759			
2.	LEARNING RATE COMPATIBLE WITH ABILITY	Between Groups	419.81	3	139.94		
		Within Groups	5975.06	3750	1.59	87.83	<.001
		Total	6394.87	3753			
3.	FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	Between Groups	155.32	3	51.77		
		Within Groups	6938.65	3731	1.86	27.84	<.001
		Total	7093.97	3734			

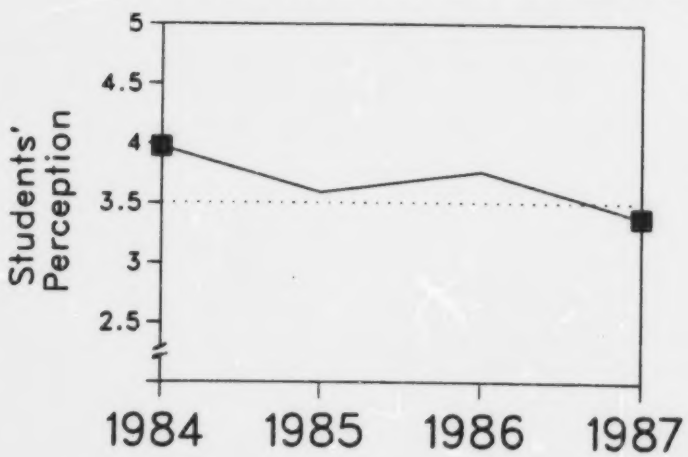
Stop Mechanism



Learning Rate Compatible with Ability



Flexible Entrance to Next Course Level



PROJECT ABC: SCHOOL-WIDE MODEL,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1984-1987

TEACHERS

VARIABLE	1984	1985	1986	1987
	Mean s.d. N	Mean s.d. N	Mean s.d. N	Mean s.d. N
1. STOP MECHANISM	4.4 .7 8	3.6 .6 12	3.9 .8 11	4.0 .6 14
2. LEARNING RATE COMPATIBLE WITH ABILITY	3.6 .5 8	3.5 1.1 12	3.4 1.1 11	3.6 .7 14
3. FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	4.1 .8 8	3.2 1.3 12	4.5 .9 11	3.9 .6 14

PROJECT ABC: SCHOOL-WIDE MODEL,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1984-1987

ADMINISTRATORS

VARIABLE	1984	1985	1986	1987
	Mean s.d. N	Mean s.d. N	Mean s.d. N	Mean s.d. N
1. STOP MECHANISM	3.5 .9 4	3.7 .8 12	4.1 .8 11	3.5 .7 12
2. LEARNING RATE COMPATIBLE WITH ABILITY	3.8 .4 4	3.7 .9 12	3.8 1.0 11	3.6 1.0 12
3. FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	2.5 .5 4	3.3 1.0 12	3.8 .7 11	3.9 .9 12

PROJECT ABC: SCHOOL-WIDE MODEL,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1984-1987

STUDENTS

VARIABLE	1984 Mean s.d. N	1985 Mean s.d. N	1986 Mean s.d. N	1987 Mean s.d. N
1. TEST USE AT UNIT LEVEL*	3.8 1.7 415	3.9 1.4 787	4.2 1.2 991	4.4 1.0 1567
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING**	3.3 1.8 414	3.3 1.6 788	3.8 1.4 990	3.5 1.5 1562
3. ADVANCEMENT BASED ON COMPETENCY***	4.1 1.3 412	3.9 1.4 783	4.1 1.2 993	4.0 1.2 1564

*F (3, 3759) = 39.13, p = <.001. Significant difference between 1984 and 1986, 1984 and 1987, 1985 and 1986, 1985 and 1987, 1986 and 1987.

**F (3, 3753) = 21.40, p = <.001. Significant difference between 1984 and 1986, 1985 and 1986, 1985 and 1987, 1986 and 1987.

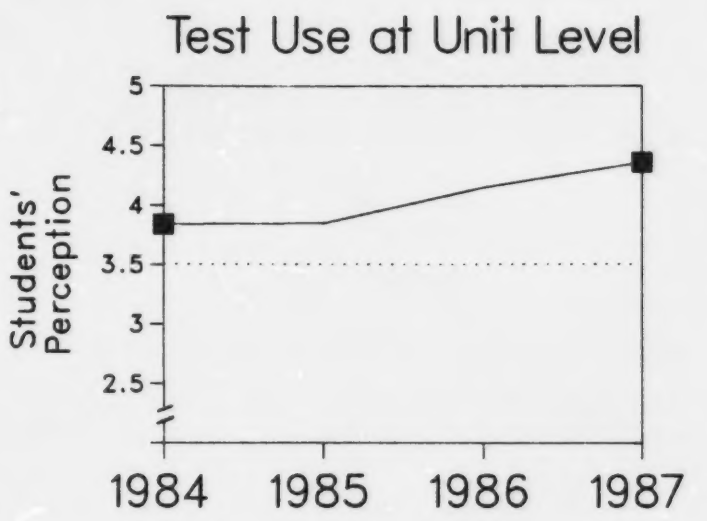
*** F (3, 3751) = 4.50, p = <.001. Significant difference between 1984 and 1985, 1985 and 1986.

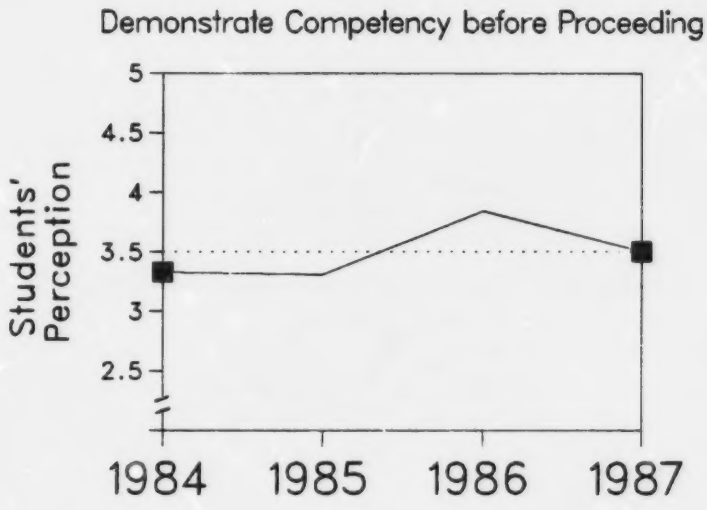
PROJECT ABC: SCHOOL-WIDE MODEL,
ANALYSIS OF VARIANCE FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

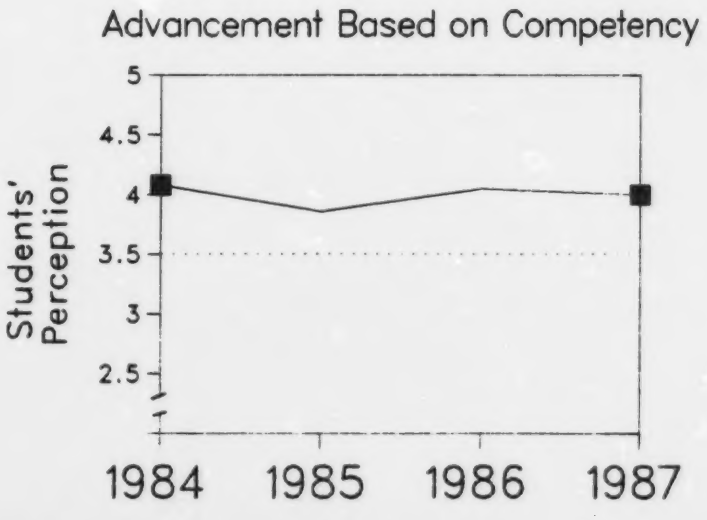
1984-1987

STUDENTS

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	TEST USE AT UNIT LEVEL	Between Groups	177.03	3	59.01		
		Within Groups	5663.94	3756	1.51	39.13	<.001
		Total	5840.98	3759			
2.	DEMONSTRATE COMPETENCY BEFORE PROCEEDING	Between Groups	151.48	3	50.49		
		Within Groups	8846.92	3750	2.36	21.40	<.001
		Total	8998.40	3753			
3.	ADVANCEMENT BASED ON COMPETENCY	Between Groups	20.55	3	6.85		
		Within Groups	5701.35	3748	1.52	4.50	<.001
		Total	5721.89	3751			


Test Use at Unit Level
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987


Demonstrate Competency before Proceeding
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987


Advancement Based on Competency
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987

PROJECT ABC: SCHOOL-WIDE MODEL,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1984-1987

TEACHERS

VARIABLE	1984	1985	1986	1987
	Mean s.d. N	Mean s.d. N	Mean s.d. N	Mean s.d. N
1. TEST USE AT UNIT LEVEL	4.8 .4 8	4.8 .4 12	4.8 .4 11	4.9 .3 14
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING	4.4 .9 8	3.5 1.3 12	4.3 .9 11	4.3 .9 14
3. ADVANCEMENT BASED ON COMPETENCY	4.1 .8 8	3.8 1.2 12	4.9 .3 11	4.9 .3 14

PROJECT ABC: SCHOOL-WIDE MODEL,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1984-1987

ADMINISTRATORS

VARIABLE	1984	1985	1986	1987
	Mean s.d. N	Mean s.d. N	Mean s.d. N	Mean s.d. N
1. TEST USE AT UNIT LEVEL	4.0 .0 4	4.5 .7 12	4.7 .5 11	4.8 .6 12
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING	3.7 .5 4	4.3 .8 12	4.5 .7 11	4.4 .6 12
3. ADVANCEMENT BASED ON COMPETENCY	4.3 .4 4	4.3 .6 12	4.9 .3 11	4.8 .4 12

APPENDIX 4

Statistical Findings

Overall Comparisons

Comments

STUDENT ACHIEVEMENT

There was no statistical analysis carried out to compare achievement levels of students among the three Project schools. Comparisons within each school over time and between each school and the Calgary Board of Education student population and the Province of Alberta student population were conducted.

TIME REMOVED AS A CREDIT REQUIREMENT

The variables ***stop mechanism***, ***learning rate compatible with ability***, and ***flexible entrance to the next course level*** extracted from the 1987 student questionnaire for each of the three models were subjected to univariate analysis of variance comparing responses among the three models. The program employed was the SPSS ONEWAY with ***post hoc*** testing.

Generally, statistical findings indicated that no model achieved the project success level of 3.5 according to students' perceptions for all three variables related to the removal of time as a credit requirement.

The variable of a ***stop mechanism*** was significant in 1987 with an $F(2, 1644) = 6.74$, $p = <.001$. The Scheffé procedure indicated significant differences between the Parallel Core Program Model and the School-wide Model. The mean response for the Parallel Core Program Model was significantly higher than the mean response for the School-wide Model in the final year of the project.

The variable ***learning rate compatible with ability*** was not achieved by any of the three models to a successful degree according to students' perceptions. No significant differences among the three models were recorded in 1987.

The variable ***flexible entrance to the next course level*** was very significant in 1987 with an $F(2, 1634) = 16.67$, $p = <.001$. The Scheffé procedure indicated significant differences between the Department-based Model and the Parallel Core Program Model and between the School-wide Model and the Parallel Core Program Model. The mean responses of students for both the Department-based Model and the School-wide Model were significantly higher than the mean response for the Parallel Core Program Model.

Descriptive statistics for teacher and administrator perceptions of these variables for 1987 across models were extracted from their respective questionnaires and are also included, although no analysis of variance was conducted due to small sample size.

Interview data referred to in the main text is reported in the five Formative Evaluation Reports.

COMPETENCY THE BASIS FOR AWARDING CREDIT

The variable *test use at the unit level, demonstrated competency at the unit level before proceeding* and *advancement based on competency, not time* on the 1987 student questionnaire was also subjected to a univariate analysis of variance comparing responses among the three models. The program employed was the SPSS ONEWAY with *post hoc* testing.

Generally, statistical findings indicated that according to student perceptions, the School-wide Model achieved the project success level of 3.5 for all three variables related to competency becoming the basis for awarding credit.

The variable *test use at the unit level*, was not significant in 1987 as all three models achieved high levels of success for this project criterion.

The variable *demonstrated competence before proceeding* was very significant in 1987 with an $F\ (2, 1640) = 15.41$, $p = <.001$. The Scheffé procedure indicated significant differences between the School-wide Model and the Parallel Core Program Model in 1987. The mean response for the School-wide Model was significantly higher than the mean response for the Parallel Core Program Model for this variable in the final year of the project.

The variable *advancement based on competency, not time* was very significant in 1987 with an $F\ (2, 1641) = 56.74$, $p = <.001$. The Scheffé procedure indicated significant differences between the School-wide Model and the Parallel Core Program Model and between the Department-based Model and the Parallel Core Program Model. The mean responses for the School-wide Model and the Department-based Model were both significantly higher than the mean response for the Parallel Core Program Model in the final year of the project.

Descriptive statistics for teacher and administrator perceptions of these variables are also included although no analysis of variance was conducted due to small sample size.

Interview data referred to in the main text is reported in the five Formative Evaluation Reports.

PROJECT ABC: COMPARISON OF THREE MODELS,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1987

STUDENTS

		DEPARTMENT-BASED MODEL	PARALLEL CORE PROGRAM MODEL	SCHOOL-WIDE MODEL
1. STOP MECHANISM*	Mean	4.0	3.9	3.5
	s.d.	1.0	0.6	1.0
	N	23	57	1565
2. LEARNING RATE COMPATIBLE WITH ABILITY	Mean	2.9	2.3	2.7
	s.d.	1.1	0.8	1.2
	N	23	56	1564
3. FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL**	Mean	4.0	2.4	3.4
	s.d.	1.0	0.9	1.4
	N	23	55	1557

* $F(2, 1644) = 6.74$, $p = <.001$. Significant difference between Parallel Core Program Model and the School-wide Model.

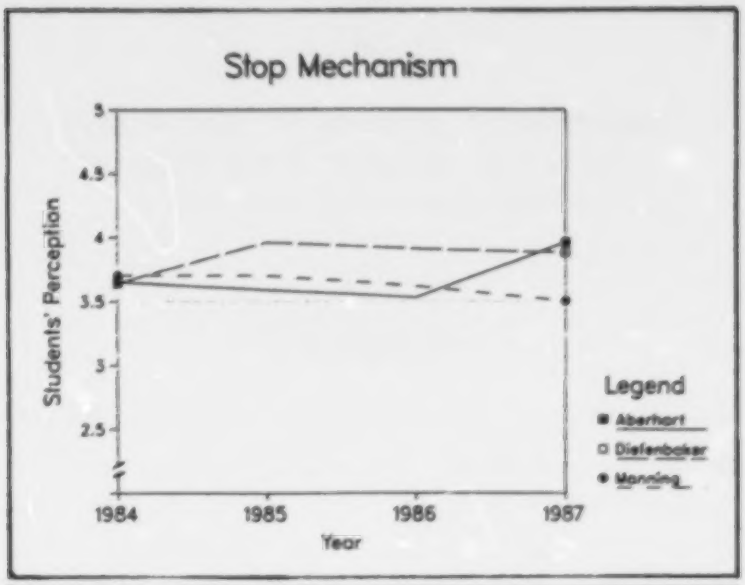
** $F(2, 1634) = 16.67$, $p = <.001$. Significant difference between Department-based Model and the Parallel Core Program Model and between the School-wide Model and the Parallel Core Program Model.

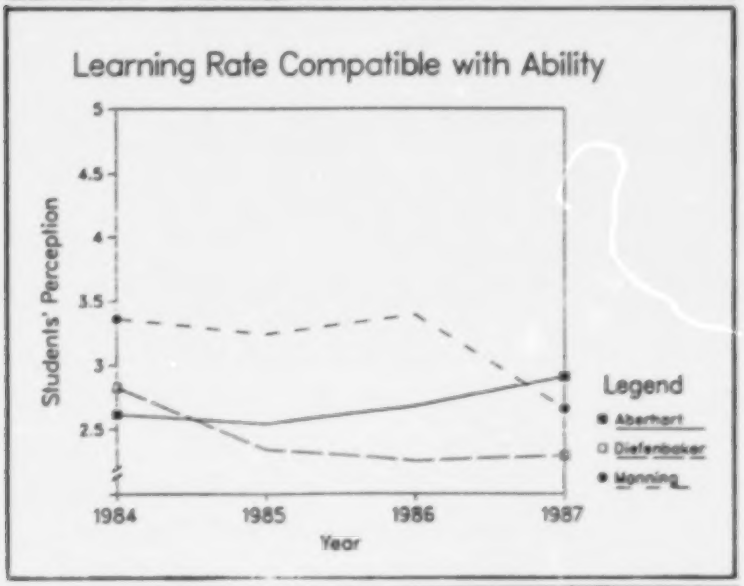
PROJECT ABC: COMPARISON OF THREE MODELS
ANALYSIS OF VARIANCE FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

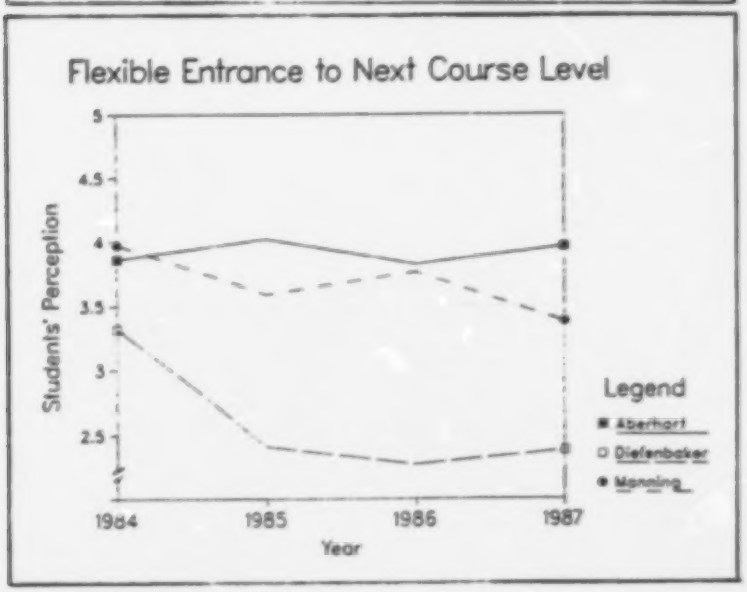
1987

STUDENTS

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	STOP MECHANISM	Between Groups	12.61	2	6.31		
		Within Groups	1536.30	1642	0.94	6.74	<.001
		Total	1548.91	1644			
2.	LEARNING RATE COMPATIBLE WITH ABILITY	Between Groups	9.21	2	4.61		
		Within Groups	2319.65	1640	1.41	3.26	0.04
		Total	2328.86	1642			
3.	FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	Between Groups	61.50	2	30.75		
		Within Groups	3011.33	1632	1.85	16.67	<.001
		Total	3072.83	1634			


Stop Mechanism
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987
Year
Legend
Aberhart
Diefenbaker
Manning


Learning Rate Compatible with Ability
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987
Year
Legend
Aberhart
Diefenbaker
Manning


Flexible Entrance to Next Course Level
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987
Year
Legend
Aberhart
Diefenbaker
Manning

PROJECT ABC: COMPARISON OF THREE MODELS,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1987

TEACHERS

		DEPARTMENT-BASED MODEL	PARALLEL CORE PROGRAM MODEL	SCHOOL-WIDE MODEL
1. STOP MECHANISM	Mean	4.4	3.9	4.0
	s.d.	4.9	.9	.6
	N	5	11	14
2. LEARNING RATE COMPATIBLE WITH ABILITY	Mean	4.6	2.6	3.6
	s.d.	.5	1.3	.7
	N	5	11	14
3. FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	Mean	4.2	1.8	3.9
	s.d.	.4	.6	.6
	N	5	11	14

PROJECT ABC: COMPARISON OF THREE MODELS,
DESCRIPTIVE STATISTICS FOR THE REMOVAL
OF TIME AS A CREDIT REQUIREMENT

1987

ADMINISTRATORS

		DEPARTMENT-BASED MODEL	PARALLEL CORE PROGRAM MODEL	SCHOOL-WIDE MODEL
1. STOP MECHANISM	Mean	3.8	3.8	3.5
	s.d.	.4	.4	.7
	N	4	6	12
2. LEARNING RATE COMPATIBLE WITH ABILITY	Mean	3.8	2.4	3.6
	s.d.	.4	1.0	1.0
	N	4	6	12
3. FLEXIBLE ENTRANCE TO NEXT COURSE LEVEL	Mean	4.0	1.5	3.9
	s.d.	.0	.5	.9
	N	4	6	12

PROJECT ABC: COMPARISON OF THREE MODELS,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1987

STUDENTS

		DEPARTMENT-BASED MODEL	PARALLEL CORE PROGRAM MODEL	SCHOOL-WIDE MODEL
1. TEST USE AT THE UNIT LEVEL	Mean	4.5	4.5	4.4
	s.d.	1.0	0.7	1.0
	N	23	57	1567
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING*	Mean	3.2	2.4	3.5
	s.d.	1.6	0.9	1.5
	N	23	56	1562
3. ADVANCEMENT BASED ON COMPETENCY**	Mean	4.5	2.3	4.0
	s.d.	0.8	1.1	1.2
	N	23	55	1564

* $F(2, 1640) = 15.41$, $p = <.001$. Significant difference between School-wide Model and the Parallel Core Program Model.

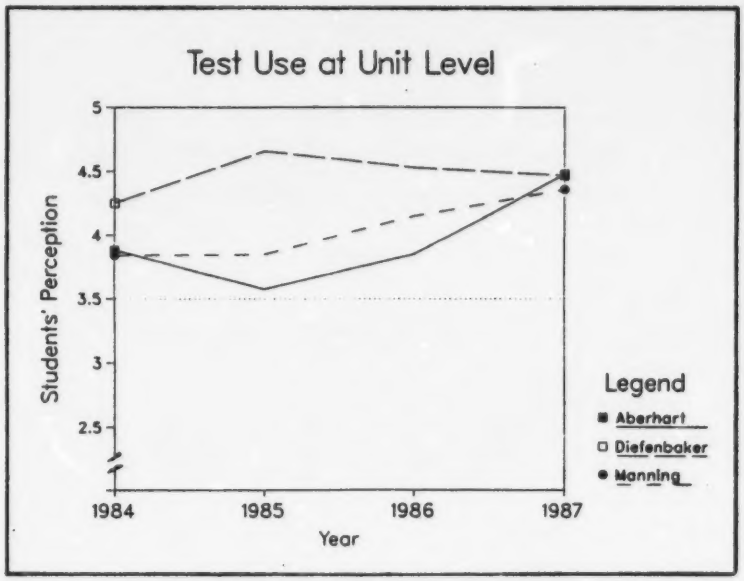
** $F(2, 1641) = 56.74$, $p = <.001$. Significant difference between the School-wide Model and the Parallel Core Program Model and between the Department-based Model and the Parallel Core Program Model.

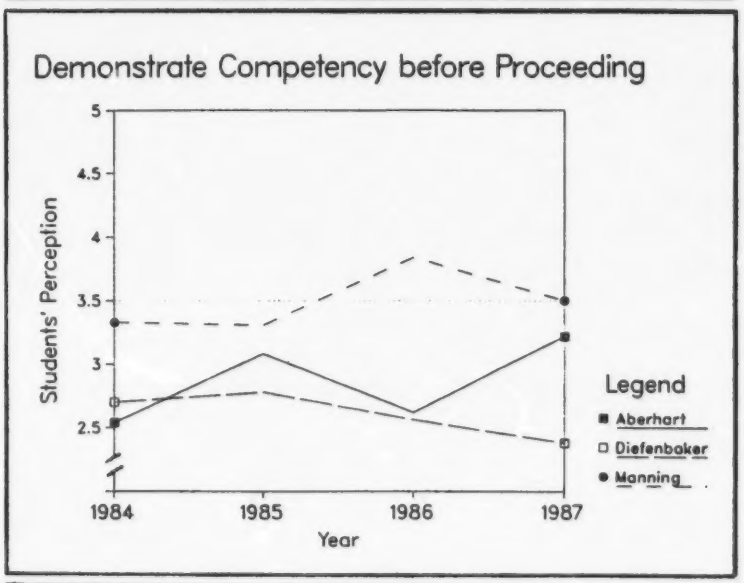
PROJECT ABC: COMPARISON OF THREE MODELS,
ANALYSIS OF VARIANCE FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

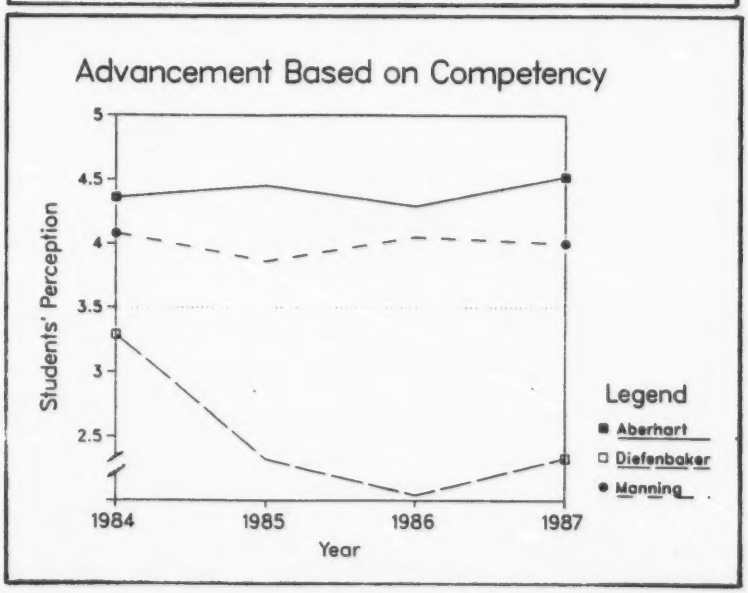
1987

STUDENTS

	VARIABLE	SOURCE	SS	df	MS	F	p
1.	TEST USE AT UNIT LEVEL	Between Groups	1.06	2	.53		
		Within Groups	1625.54	1644	.99	0.54	0.58
		Total	1626.60	1646			
2.	DEMONSTRATE COMPETENCY BEFORE PROCEEDING	Between Groups	70.45	2	35.22		
		Within Groups	3743.50	1638	2.29	15.41	<.001
		Total	3813.95	1640			
3.	ADVANCEMENT BASED ON COMPETENCY	Between Groups	156.55	2	78.27		
		Within Groups	2260.84	1639	1.38	56.74	<.001
		Total	2417.39	1641			


Test Use at Unit Level
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987
Year
Legend
Aberhart
Diefenbaker
Manning


Demonstrate Competency before Proceeding
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987
Year
Legend
Aberhart
Diefenbaker
Manning


Advancement Based on Competency
Students' Perception
5
4.5
4
3.5
3
2.5
1984
1985
1986
1987
Year
Legend
Aberhart
Diefenbaker
Manning

PROJECT ABC: COMPARISON OF THREE MODELS,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1987

TEACHERS

		DEPARTMENT-BASED MODEL	PARALLEL CORE PROGRAM MODEL	SCHOOL-WIDE MODEL
1. TEST USE AT THE UNIT LEVEL	Mean	4.4	4.9	4.9
	s.d.	.5	.3	.3
	N	5	11	14
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING	Mean	4.0	2.7	4.3
	s.d.	.0	.7	.9
	N	5	11	14
3. ADVANCEMENT BASED ON COMPETENCY	Mean	4.8	2.1	4.9
	s.d.	.4	.7	.3
	N	5	11	14

PROJECT ABC: COMPARISON OF THREE MODELS,
DESCRIPTIVE STATISTICS FOR COMPETENCY
BECOMING THE BASIS FOR AWARDING CREDIT

1987

ADMINISTRATORS

		DEPARTMENT-BASED MODEL	PARALLEL CORE PROGRAM MODEL	SCHOOL-WIDE MODEL
1. TEST USE AT THE UNIT LEVEL	Mean	4.8	4.7	4.8
	s.d.	.4	.5	.6
	N	4	6	12
2. DEMONSTRATE COMPETENCY BEFORE PROCEEDING	Mean	4.0	3.3	4.4
	s.d.	.0	.8	.6
	N	4	6	12
3. ADVANCEMENT BASED ON COMPETENCY	Mean	4.8	2.2	4.8
	s.d.	.4	1.3	.4
	N	4	4	12

APPENDIX 4

Sample Instruments

STUDENT QUESTIONNAIRE

PROJECT ABC

(ABERHART VERSION)

INSTRUCTIONS:

1. Use a "bubble sheet" and an HB pencil to answer these questions - do not mark the questionnaire.

2. Do not write your name on the answer sheet.

3. If you cannot answer a question, or it is inappropriate for you, leave it out.

Thanks for your help!

STUDENT QUESTIONNAIRE
PROJECT ABC

FOR OFFICE USE ONLY	ANSWER QUESTIONS 1 - 3.		
S0.10	1. What school do you go to?	[ ] William Aberhart	(01)
		[ ] John Diefenbaker	(02)
		[ ] Ernest Manning	(03)
		[ ] Sir Winston Churchill	(04)
S0.20	2. What grade are you in?	[ ] Grade 10	(01)
		[ ] Grade 11	(02)
		[ ] Grade 12	(03)
S0.30	3. In what semester are you answering this questionnaire?	[ ] Semester 1	(01)
		[ ] Semester 2	(02)

The rest of the questionnaire asks you about how often you can do certain activities in this course and how you feel about this course generally.

You will answer questions on a scale of 1 to 5 where:

1 = Never
2 = Seldom
3 = Sometimes
4 = Usually
5 = Always

So that if the question said:

	Never	Seldom	Sometimes	Usually	Always
I like weekends because I can sleep in.	1	2	3	4	5

and you felt that this was "Always" the case, you would colour in the 5 bubble on your answer sheet.

GO ON TO PAGE 2

FOR OFFICE USE ONLY	ANSWER ALL QUESTIONS FROM 4 - 22. (Unless it is not appropriate - then leave it out!)	Never	Seldom	Sometimes	Usually	Always
S1.10	4. I am satisfied with my achievement level in this course.	1	2	3	4	5
S4.10	5. I think this is the right course for me.	1	2	3	4	5
S4.20	6. I can choose where I will learn in this course (in the library, in a classroom, at home, etc.).	1	2	3	4	5
S4.30	7. I can concentrate on a particular problem I am having until it is solved.	1	2	3	4	5
S4.41	8. I write a test or do a special assignment at the end of each unit in this course.	1	2	3	4	5
S4.42	9. I must earn a certain mark in this unit test or special assignment before proceeding to the next unit.	1	2	3	4	5
S4.50	10. I can use additional materials to go beyond course requirements if I want to.	1	2	3	4	5
S5.10	11. I can spend as long as I need to complete course requirements.	1	2	3	4	5
S5.21	12. I can begin the next course in this subject whenever I am ready to do so.	1	2	3	4	5
S5.22	13. I may timetable my course at any time during the school day.	1	2	3	4	5
S5.30	14. I can exit from this course whenever I have completed the requirements.	1	2	3	4	5
S6.11	15. I like the way this course is organized.	1	2	3	4	5
S6.12	16. I am satisfied with the amount of challenge I am experiencing in this course.	1	2	3	4	5
S6.13	17. I am satisfied with the number of students I know in this course.	1	2	3	4	5
S6.41	18. I am able to communicate with my teacher.	1	2	3	4	5

GO ON TO PAGE 3

FOR OFFICE USE ONLY			Never	Seldom	Sometimes	Usually	Always
S6.46	19.	I am able to communicate with the students in this class.	1	2	3	4	5
S6.42	20.	My teacher takes an interest in my success in this course.	1	2	3	4	5
S7.11	21.	I am satisfied with the classroom learning materials I use in my course.	1	2	3	4	5
S7.12	22.	I am satisfied with school library resources that I can use for my course.	1	2	3	4	5

THANK YOU!

TEACHER QUESTIONNAIRE

PROJECT ABC

INSTRUCTIONS:

1. Please answer right on this questionnaire.

2. Put a tick in the box [✓] beside the appropriate answer in the first part of the questionnaire.

3. Circle the appropriate number in the second part of the questionnaire depending on your response:

   1 I never...
   2 I seldom...
   3 I sometimes...
   4 I usually...
   5 I always...

4. If you cannot answer a question, or it is not applicable, leave it out.

This is the last year of the study - let's make it a good one.

Thanks for your help!

Gail V. Barrington, Ph.D.
Project ABC Evaluator
(270-7571)

FOR OFFICE USE ONLY

TEACHER QUESTIONNAIRE
PROJECT ABC

T0.10 1. What school do you work in?

[ ] William Aberhart (01)
[ ] John Diefenbaker (02)
[ ] Ernest Manning (03)
[ ] Sir Winston Churchill (04)

T0.30 2. How many years of teaching experience do you have?

[ ] This is my first year (01)
[ ] 1-2 years (02)
[ ] 3-5 years (03)
[ ] 6-10 years (04)
[ ] More than 10 years (05)

T0.40 3. Are you involved in Project ABC (PEP, PACE)?

[ ] Yes (01)
[ ] No (02)

T0.61 4. How many hours of preparation time per week do you have for preparing instruction and marking students' work?

[ ] 2 hours or fewer (01)
[ ] 3-5 hours (02)
[ ] 6-9 hours (03)
[ ] 10 hours or more (04)

T0.62 5. How many additional hours of your own time per week do you use for preparation activities?

[ ] 2 hours or fewer (01)
[ ] 3-5 hours (02)
[ ] 6-9 hours (03)
[ ] 10 hours or more (04)

T0.63 6. How much release time (including professional development days) have you been provided with this term for program development and revision?

[ ] less than 1 day (01)
[ ] 1-2 days (02)
[ ] 3-5 days (03)
[ ] more than 5 days (04)

		Never	Seldom	Sometimes	Usually	Always
T1.10	7. I feel satisfied with the level of student achievement in my courses this year.	1	2	3	4	5
T2.10	8. I feel satisfied with the coverage of the Alberta curriculum in my courses.	1	2	3	4	5
T4.10	9. I believe that students have been selected appropriately for my courses.	1	2	3	4	5

FOR OFFICE USE ONLY		Never	Seldom	Sometimes	Usually	Always
T4.20	10. Students choose where they will learn (e.g., in the library, in a classroom, at home).	1	2	3	4	5
T4.30	11. Students can interrupt their progress to concentrate on a particular problem they are encountering until it is solved.	1	2	3	4	5
T4.41	12. Students are tested for achievement by unit tests or special assignments at the end of each unit of my courses.	1	2	3	4	5
T4.42	13. Students must demonstrate a specific level of competence for each unit of a course before proceeding to the next unit.	1	2	3	4	5
T4.50	14. Students have access to enrichment material to go beyond the content of a course if they wish to do so.	1	2	3	4	5
T5.10	15. Students can take as much time as they need to complete course requirements based on their learning needs.	1	2	3	4	5
T5.21	16. Students may enter the next course in this subject whenever they are ready to do so.	1	2	3	4	5
T5.22	17. Students may timetable their courses at any time during the school day.	1	2	3	4	5
T5.30	18. Students may exit from courses whenever they have completed its requirements.	1	2	3	4	5
T6.11	19. Students like the way I organize my courses.	1	2	3	4	5
T6.12	20. Students are receiving sufficient challenge in their courses.	1	2	3	4	5
T6.21	21. I am experiencing a sense of achievement as a teacher in my courses.	1	2	3	4	5
T6.22	22. My work in my courses is recognized by staff members.	1	2	3	4	5

FOR OFFICE USE ONLY			Never	Seldom	Sometimes	Usually	Always
T6.41	23.	I am satisfied with my communication with my students.	1	2	3	4	5
T6.42	24.	I am satisfied that I demonstrate an interest in students' success in my courses.	1	2	3	4	5
T6.45	25.	I am satisfied with my communication with other staff members about my courses.	1	2	3	4	5
T6.43	26.	I am satisfied generally with communication in this school.	1	2	3	4	5
T7.11	27.	I am satisfied with the classroom learning materials available to students in my courses.	1	2	3	4	5
T7.12	28.	I am satisfied with the school library resources available to students in my courses.	1	2	3	4	5
T7.13	29.	I am satisfied with the adequacy of support provided by teacher aides, clerical aides, and/or student pages.	1	2	3	4	5
T7.14	30.	I am satisfied with the adequacy of equipment available for use in my courses.	1	2	3	4	5
T7.21	31.	I am satisfied with the amount of preparation time I have per week for preparing instruction and marking students' work.	1	2	3	4	5
T7.22	32.	I am satisfied with the amount of release time per term which I receive for program development and revision.	1	2	3	4	5

ADMINISTRATOR QUESTIONNAIRE

PROJECT ABC

INSTRUCTIONS:

1. Please answer right on this questionnaire.

2. Put a tick in the box [✓] beside the appropriate answer in the first part of the questionnaire.

3. Circle the appropriate number in the second part of the questionnaire depending on your response:

   1 I never...
   2 I seldom...
   3 I sometimes...
   4 I usually...
   5 I always...

4. If you cannot answer a question, or it is not applicable, leave it out.

This is the last year of the study - let's make it a good one.

Thanks for your help!

Gail V. Barrington, Ph.D.
Project ABC Evaluator
(270-7571)

FOR OFFICE USE ONLY

ADMINISTRATION QUESTIONNAIRE
PROJECT ABC

A0.10 1. What school do you work in?
[ ] William Aberhart (01)
[ ] John Diefenbaker (02)
[ ] Ernest Manning (03)

A0.50 2. What is your position?
[ ] Principal or Assistant Principal (01)
[ ] Department Head or Curriculum Coordinator (02)
[ ] Counsellor (03)

			Never	Seldom	Sometimes	Usually	Always
A1.10	3.	I feel satisfied with the level of student achievement in Project ABC this year.	1	2	3	4	5
A2.10	4.	I feel satisfied with the coverage of the Alberta curriculum in Project ABC courses.	1	2	3	4	5
A4.10	5.	I believe that students have been selected appropriately for Project ABC courses.	1	2	3	4	5
A4.20	6.	Project ABC students choose where they will learn (e.g., in the library, in a classroom, at home).	1	2	3	4	5
A4.30	7.	Project ABC students can interrupt their progress to concentrate on a particular problem they are encountering until it is solved.	1	2	3	4	5
A4.41	8.	Project ABC students are tested for achievement at the end of each unit.	1	2	3	4	5
A4.42	9.	Project ABC students must demonstrate a specific level of competence for each unit of a course before proceeding to the next unit.	1	2	3	4	5
A4.50	10.	Project ABC students have access to enrichment material to go beyond the content of a course if they wish to do so.	1	2	3	4	5

R OFFICE SE ONLY			Never	Seldom	Sometimes	Usually	Always
A5.10	11.	Project ABC students can take as much time as they need to complete course requirements based on their learning needs.	1	2	3	4	5
A5.21	12.	Project ABC students may enter the next course in a subject whenever they are ready to do so.	1	2	3	4	5
A5.22	13.	Project ABC students may timetable their courses at any time during the school day.	1	2	3	4	5
A5.30	14.	Project ABC students may exit from courses whenever they have completed course requirements.	1	2	3	4	5
A6.11	15.	Project ABC students like the way their courses are organized.	1	2	3	4	5
A6.12	16.	Project ABC students are receiving sufficient challenge in their courses.	1	2	3	4	5
A6.21	17.	Project ABC teachers are experiencing a sense of achievement.	1	2	3	4	5
A6.22	18.	Project ABC teachers' work is being recognized by other staff members.	1	2	3	4	5
A6.23	19.	I am satisfied with staff morale relative to Project ABC.	1	2	3	4	5
A6.30	20.	I am satisfied with the development of Project ABC in my school.	1	2	3	4	5
A6.42	21.	I am satisfied that Project ABC teachers demonstrate an interest in their students' success.	1	2	3	4	5
A6.44	22.	I am satisfied with communication in this school about Project ABC (PEP, PACE)	1	2	3	4	5
A7.11	23.	I am satisfied with the classroom learning materials available to Project ABC students.	1	2	3	4	5

FOR OFFICE USE ONLY			Never	Seldom	Sometimes	Usually	Always
A7.12	24.	I am satisfied with the school library resources available to Project ABC students.	1	2	3	4	5
A7.13	25.	I am satisfied with the adequacy of support provided by teacher aides and/or clerical aides through Project ABC.	1	2	3	4	5
A7.14	26.	I am satisfied with the adequacy of equipment available for use in Project ABC.	1	2	3	4	5
A7.21	27.	Project ABC teachers have adequate preparation time per week for preparing instruction and marking students' work.	1	2	3	4	5
A7.22	28.	Project ABC teachers have adequate release time per term for program development and revision.	1	2	3	4	5